OHIO STATE UNIVERSITY
AUG 19 1936
LIBRARY
TK1
E39
v.35

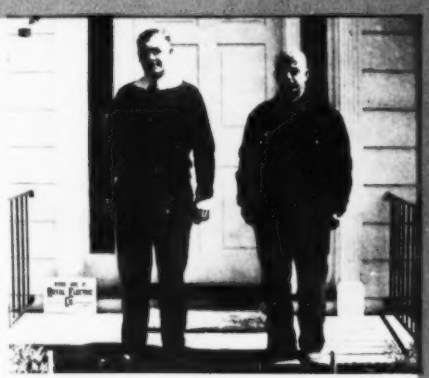
AUGUST 1936

ELECTRICAL CONTRACTING

OHIO STATE UNIVERSITY LI
COLUMBUS OHIO
COPY #

ENGINEERING • INSTALLATION • REPAIRING • MARKETING

"Radial Wiring IS IDEAL— WE CAN SELL ADEQUACY ALL IN ONE 'Package'."



Charles L. Kelly (left) and A. F. Schlosser, proprietors of the Royal Electric Co., Bridgeport, Conn.

HERE'S A TYPICAL STATEMENT DEMONSTRATING WHY IT WILL PAY YOU TO PROMOTE G-E RADIAL WIRING SYSTEMS

The G-E Radial Wiring System which the Royal Electric Co. installed in the Fairfield "New American" Home, was the first Radial Wiring job handled by these contractors. After they had completed the installation, they commented:

"The G-E Radial Wiring System has such big advantages for home owners, and for us, that we're going to promote it on all our future jobs. Its greatest benefit is that it provides our customers with REAL wiring adequacy — for their present electrical equipment and what may be added later. From our viewpoint, Radial Wiring is ideal because we can sell this adequacy all in one 'package' — the entire specified system. In addition, because Radial Wiring prevents costly voltage losses, we can tell people that it saves them money. We like the Branch-circuit Circuit Breakers, too. People have their circuits fully protected and yet have only to flip the breaker handle if an overload occurs, instead of running to the cellar to replace fuses. Radial Wiring is a 'natural' — for the public, for contractors."

A G-E sponsored "New American" home at Fairfield, Conn., in which the Royal Electric Co. installed a G-E Radial Wiring System. The house contains complete electrical equipment.

You also will profit by promoting and installing G-E Radial Wiring Systems. Learn how you can receive a valuable certificate stating that you are qualified to make Radial Wiring Installations. Address Dept. CDW-688, General Electric Co., Bridgeport, Conn.

GENERAL ELECTRIC

WIRING MATERIALS

APPLIANCE AND MERCHANDISE DEPARTMENT
GENERAL ELECTRIC CO., BRIDGEPORT, CONN.

UMI

Profits

FOR THE CONTRACTOR with G-E TIME SWITCHES

As a contractor you are interested in getting the biggest possible profits on store and show-window lighting installations. Have you considered: ♦ That the convenient knockouts and liberal spacing at the terminal block of G-E time switches will reduce wiring time and save you money? ♦ That G-E time switches have ready customer acceptance because your prospects know the G-E monogram stands for high-quality electric products? ♦ That superior design and sturdy construction assure you there will be no expensive service calls to cut into your profits? A G-E time switch can be wired and forgotten. ♦ For details and prices write to the nearest office of the G.E. Supply Corporation or of the Graybar Electric Company, or to General Electric, Dept. 6A-201, Schenectady, New York.

GENERAL ELECTRIC

HOWARD EHRLICH
Vice-President

S. B. WILLIAMS
Editor

F. J. SEILER
Assistant Editor

GLENN SUTTON
Manager

Established 1901

INSTALLATION

ENGINEERING

MAINTENANCE

REPAIRING

MANAGEMENT

MARKETING

for

ELECTRICAL CONTRACTORS
INDUSTRIAL
COMMERCIAL
RESIDENTIAL

ELECTRICAL INSPECTORS

ENGINEERS

SERVICE SHOPS

and others engaged in the business of electrical construction

ELECTRICAL CONTRACTING

With which is consolidated
The Electragist and Electrical Record

Vol. 35 **August, 1936** No. 10

CONTENTS

Direct-Coupled Equipment for Accurate Motor Testing..... 6

Some Lighting Features at Great Lakes Exposition, *by Dean M. Warren*..... 8

Adequate Farm Wiring Demonstration 9

Bottle Necks, *by J. O. Case* 13

Steady-Thrust Motor-Driven Press 14

Let the Women Sell Adequate Wiring, *by Mildred A. Nichols* 15

Modern Entertainment Lighting 16

Price Discrimination Outlawed 17

Service Cable, *by Samuel J. Rosch* 18

DEPARTMENTS

Construction Methods 20
Service Shop Practice 28
Lighting Data 36
Code Chats 42
Editorials 46
N.E.C.A. News 48
Contracting News 54
New Products 61

Advertisers' Index 64

McGRAW-HILL PUBLISHING COMPANY, INC.
Publication Office, 99-129 North Broadway, Albany, N. Y.
Editorial and Executive Offices, 330 W. 42nd St., New York, N. Y.

JAMES H. McGRAW, JR., Chairman
MALCOLM MUIR, President
JAMES H. McGRAW, Honorary Chairman
HOWARD EHRLICH, Vice-President
B. R. PUTNAM, Treasurer
D. C. McGRAW, Secretary

Branch offices: 520 North Michigan Ave., Chicago; 883 Mission St., San Francisco; Aldwych House, Aldwych, London, W.C. 2; Washington; Philadelphia; Cleveland; Detroit; St. Louis; Boston; Atlanta.

Published monthly, price 25 cents a copy. Subscription rates: U. S. and Canada, $2 a year; all other countries $2.50 a year. Application for entry as second-class matter at Albany, N. Y., pending. Printed in U.S.A. Copyright 1936, by McGraw-Hill Publishing Company. Cable address: "McGrawhill, New York." Member A.B.P. Member A.B.C.

UMI

USE **U.S.** CLEANSTRIP

SAFECOTE

for Speed

PROVEN 4½ TIMES FASTER STRIPPING
2 TIMES FASTER JOINING

ELECTRICAL SAFECOTE CONDUCTORS

FLAME RETARDING · MOISTURE RESISTING · FISHABLE — SLICK FINISH

U. S. LETTERS PATENT NUMBERS:
1,635,829 1,798,486 1,772,436 1,410,790 1,765,000 1,536,549
OTHER PATENTS PENDING

Time Studies made during the wiring of a school building proved *U. S. Cleanstrip Safecote* the fastest, cleanest stripping wire manufactured today. No scraping necessary after stripping—no time lost in re-tinning before joining and soldering. Use this time-saving line.

United States Rubber Company
United States Rubber Products, Inc., New York, N. Y.

AUGUST 1936

Circulation

CIRCULATION or readership is the backbone of every magazine. Unless the paper is read and has a following it has no reason for existence. In addition, the type of reader must be taken into consideration. Business magazines, such as ELECTRICAL CONTRACTING, must not only define their fields, but also the kind of reader desired in each field. This is essential if advertisers are to receive value for their expenditures.

FOR that reason mailing lists of prospective subscribers are built selectively. The trend of the times is for paid circulation magazines to know more and more about the business of their subscribers and prospects not only to be able to serve them with a better paper, but to be able to intelligently select the subscribers. It is this selective quality of paid circulation that makes it so valuable as an advertising audience.

THIS should not be taken, however, as any indication that selected paid circulation is static. In fact the circulation of progressive papers is very apt to be fluid. In other words, changing conditions or new services will bring new types of readers. Thus ELECTRICAL CONTRACTING sensed a demand from its industrial type contractors for service shop information. Immediately this service was started the whole electrical service shop industry became a new field for circulation effort. Likewise close atttention to the National Electrical Code and wiring regulations brought the inspector into our field. As the service of the paper to its field expands, others with interests similar to those of the contractor will become a part of the field of the magazine.

THE circulation of ELECTRICAL CONTRACTING has been carefully built over a period of years. During the depression when the electrical construction business dropped off between 75 and 90 percent; when well over 50 percent of the contractors folded up, the circulation of ELECTRICAL CONTRACTING was maintained within a few percent of the 1927-1929 average. The only volume lost was that added in 1930 and 1931 because of the Resale Price Service and when the service later was discontinued, the circulation fell back to its normal level. It is a record like this that speaks well for selected circulation.

UMI

THE WORLD'S BEST PROSPECT FOR A REWIRING JOB

may not know an outlet from a circuit!

THE first step in selling a rewiring job is to educate prospects on the *need* for adequate wiring.

That's what our booklet, "The Key to Better Living," does for you. Addressed to your customers, it explains in plain everyday language the mysteries of house wiring and its relation to the convenient use of lighting and appliances... stresses the difference between adequate and inadequate wiring. We have a plan for distributing imprinted copies of the booklet to your customers. You'll want to know about it. Your name on the coupon below brings you the details.

This booklet can help you educate, interest, sell

Room 1553, Graybar Building, 420 Lexington Avenue, New York, N. Y.

Gentlemen: Please send us full information about your booklet, "The Key to Better Living."

EC 8-36

NAME.....

ADDRESS.....

CITY..... STATE.....

Graybar

OFFICES IN 79 PRINCIPAL CITIES

ELECTRICAL CONTRACTING

Vol. 35 AUGUST, 1936 No. 10

▲

S. B. Williams, Editor

▼

FIELD BRIEFS

● NEW IDEAS for outings — a knob and tube installation contest with participants riding burros; a drilling contest for strong contractors — initiated at its July 23 outing by the Electrical League of Colorado.

● A SERVICE CONDUCTOR breakdown which the Telotte Electric Co., San Antonio, Tex., was called upon to repair revealed the service conduit to be filled with small ants. Upon pulling out the conductors, it was found that the pests had enjoyed a feast of insulation, leaving the wires almost stripped clean.

● DURING DEPRESSION years the motor service shops in the southwestern states were forced to lay off winders. As a result many of these men went in business for themselves in smaller communities of from 5,000 to 10,000 population. Much motor work which formerly was shipped 200 miles or more to be repaired is now being done in such small localities. Because these local shops usually do only a small business, their limited stock and production equipment results in a great deal of slip shod and low-priced work.

● AN INTENSIVE RANGE campaign is going over quite well in thickly-populated Brooklyn, N. Y. The goal is 25,000 electric ranges in three years, which means nearly a million dollars in additional wiring for the local contractors.

● ONE OF RIPLEY'S "Believe it or not" curiosities, a 32-c.p. lamp that has been burning in the old Byers Opera House at Ft. Worth, Tex., since 1908, is coming down during the remodelling work for a new movie theatre. The Paramount Electric Co. of Dallas, Tex., has also removed other obsolete items such as a live front stage switchboard, cast iron split-body switch boxes.

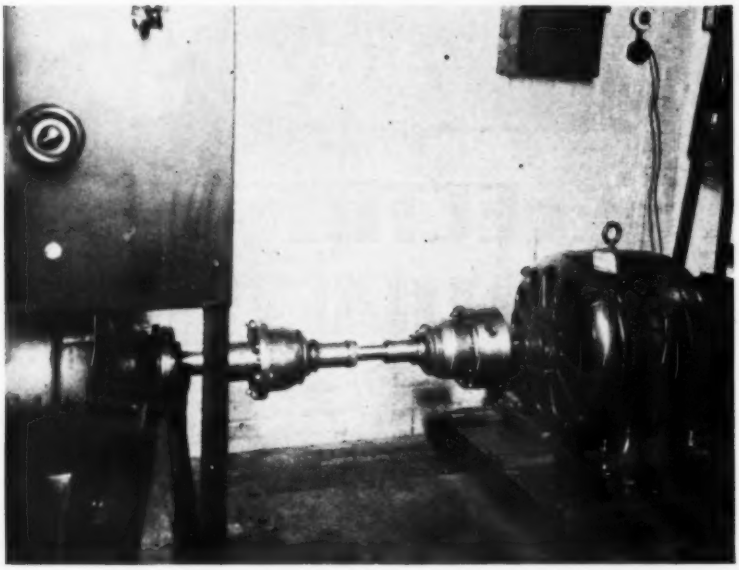
● PAPER SHELL fixture socket listing has been drawn by Underwriters' Laboratories. Fixture sockets to be approved must now have the screw shells better protected by an insulating shell which may or may not be molded integral with the base.

● THE CITY of San Antonio, Tex., has had an ordinance in effect for more than two years which permits nothing smaller than No. 12 for all branch circuit wiring.

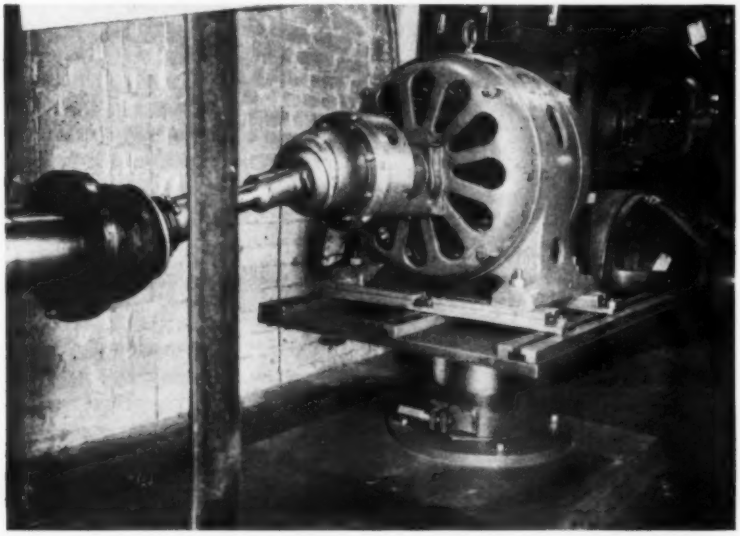
● FROM WATTS-PER-SQUARE-FOOT we now evolve to k.v.a.-per-acre. It is claimed that the Texas Centennial Exposition at Dallas, Tex., with transformers provided for serving 72 k.v.a. per acre, and with total lamps installed averaging 86 k.w. per acre, sets a new record and represents 30 per cent more light than was averaged at a Century of Progress in Chicago. It is roughly estimated that electrical contractors installed over $1,000,000 of work at the exposition. Nearly all local contractors participated. There are thirty-eight load center sub-stations at 4 k. v. Over 1600 tons of mechanical refrigeration capacity for air-conditioning 35 exhibits is claimed to set a new record for expositions.

UMI

Direct–



Direct-drive motor tests are made either by driving the floating dynamometer (left) as a generator, loaded by a bank of energy-dissipating resistors, or by using the dynamometer as a motor to drive a reconditioned motor (right) for wearing in new bearings at slow speed, or for testing a generator. The a.c. motor supply current is controlled from a safety switch located on the wall behind the motor. Motors from 3 to 50 hp. may be bolted to the special laminated sliding rails that were made up from strips of rabbeted 1-in. by 3-in., and 1-in. by 1¼-in. steel bars. Three rails parallel the motor shaft to provide rigid yet adjustable three-point support for the slotted and also adjustable motor-feet bolting rails. The two top rails take ½-in. or ⅝-in. motor bolts, in a heads-down locked-in position. Bolts can't turn when they are tightened nor can they drop out when the nuts are removed.



By using two "Spicer" universals and a spline slip joint in the 36-in. shaft, this drive is flexible even though the two units may not be in exact alignment. The dynamometer and motor bed plate are mounted upon a 34-in. wide, 111-in. long cast-iron milled surface base that is secured to the shop floor. The 32-in. long, 29-in. wide, 1-in. thick motor mounting ledge or plate is bolted to a steel cylinder. This cylinder telescopes through a heavy flange and slotted clamping collar on the main bed. A 1¼-in. steel shaft or screw within the inner cylinder has No. 12 threads. It is equipped with a bevelled gear driving rod which extends horizontally from within the cylinder to a crank at the rear side of the bed plate. A bronze nut that is secured in the bottom end of the outer casing causes the rotated 1¼-in. screw to push the inner cylinder and motor bed plate to the desired elevation. The upper end of this screw is provided with ball bearings. The cylinders are machined to .002-in. tolerance.

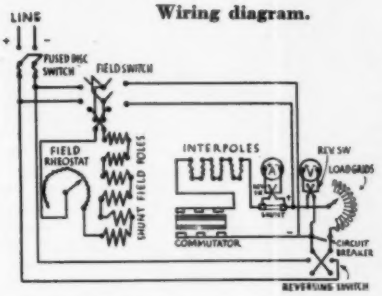
TO obtain accurate facilities for testing 3 to 50 hp. a.c. motors, the Davidson Electric Company of Brooklyn, N. Y. designed and assembled accessories for a rebuilt dynamometer outfit that permits quick and rigid mounting of motors to be tested, yet also provides a flexible shaft, direct-coupled drive. The dynamometer rests on cradle type ball bearing brackets, and registers motor torque deflections upon special scales that are mounted on the front of the control switchboard. While the primary purpose of this machine is for testing the performance of rewound motors, it serves equally well for making a complete "diagnosis" of motors that appear to have doubtful characteristics, although no electrical defects are apparent.

This unit is designed to operate on the generator-loading principle, and may, therefore, be used for testing motor performance under any desired partial or overload basis, and for any desired period of time. No braking friction is encountered, therefore no slippage factors or maintenance problems are encountered. Tests for starting torque, for locked rotor torque, and for full load temperature rise at various time values, can be conducted for any conventional a.c. motor speed with equal success. Because of the flexible direct drive equipment, belting and pulley-ratio problems are entirely eliminated.

The dynamometer unit has a generator rating of 50 k.w., 450–1800 r.p.m., 230 v. d.c. It supplies a bank of resistors that comprise its artificial load, when the unit is being driven by a test motor. The dynamometer may also be operated as a d.c. motor for driving a test motor on bearing break-ins, or for testing generators. Since its speed as a motor may be regulated from 200 to 4500 r.p.m., new bearing installations on high-speed motors may be run in at low speeds. Because of the high speeds obtainable, special banding was applied to the armature to withstand the severe peripheral stresses that would occur.

Motor shafts ranging in diameter

Coupled Equipment for Accurate Motor Testing



Wiring diagram.

from 1 in. to 2⅜ in. may be coupled to the universal dynamometer drive shaft by means of a self-centering 3-jaw chuck. This chuck is connected to a 36-in. long drive shaft in which are interposed two "Spicer" universals, such as are used on the drive shafts of large automobile trucks. These universals have interposed between them a spline or slip coupling, which consists of a fluted mandrel which engages within a hollow and fluted section of steel drive shaft. A free lateral take-up of 5 in. is thus available between the two drive shaft universals. This feature eliminates an otherwise rigid coupling effect, and provides liberal end-play for the rotor of a test motor to assume its normal magnetic center.

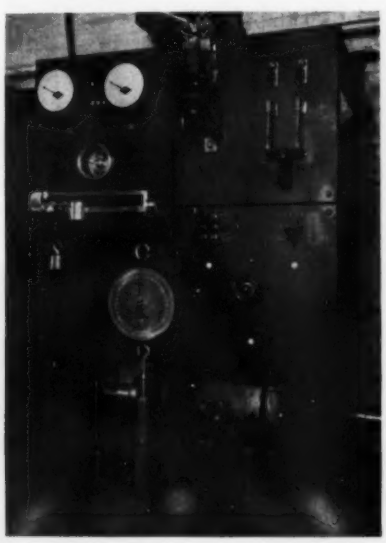
The chuck jaws have been ground to seat snugly against the key and also next to the shaft surface. Because of this positive method of locking the motor shaft and chuck, it is possible to conduct severe overload or locked-rotor starting torque tests without chuck slippage, and without scarring the shaft surface. Having selected extremely rugged universals and spline fittings, there is no hesitancy to conduct any desired type of test within the load and alignment limits of this machine.

A specially built mounting bedplate was provided that accommodates from 3-hp. to 50-hp. motors. It is easily raised or lowered to align the motor and dynamometer shafts of motors within the range of No. 225 to No. 505 standard NEMA frame dimensions. Slide rails give universal adjustment for variously spaced motor frame bolts. It is claimed that one man can set up and align a motor for a test in ½-hr.

Tests are conducted from the front of the control switchboard, where generator loading controllers and two types of torque-measuring scales are mounted. A 400-lb. double-acting spring scale indicates the deflection exerted upon the floating dynamometer during motor starting tests. A scale of the steel-yard balancing principle is used for obtaining closely-defined torque values during running load tests. For checking power factor and a.c. input a portable industrial analyzer instrument is placed nearby. The foot-pound values that are indicated on either scale are interpreted upon a separate motor horsepower conversion table.

Equipment that will provide additional refinements for this machine has been assembled but is not yet attached. A 450/2400 r.p.m. tachometer will be placed on the bottom right-hand switchboard panel, with its flexible shaft and driving pinion bracketted to the dynamometer shaft. A press-button counting mechanism which registers up to 99999 revolutions is integral with this tachometer, for counting revolutions against stop-watch time. A large-scale synchronous motor clock is to be mounted above the board to facilitate such counts. To reduce set-up labor for locked-rotor tests, the out-board end of the dynamometer shaft has been provided with a special hub for incorporating a magnetic brake. This brake will be cap able of quickly locking the shaft by means of a remote control station which is to be installed on the switchboard.

An end view of the control board reveals the arrangement of the scale rods which impart to both scales the deflecting torque that the balanced dynamometer receives during a motor test. The generator load resistors are racked overhead against the rear wall. P. Davidson, one of the designers of this testing equipment, is standing by the dynamometer.



The 48-in. by 72-in. test board has mounted on it the following equipment:

Panel No. 1. Top row, left to right
0/150 scale d.c. ammeter
2 p., D. T., instrument switch for changing from motor to generator service
2 p., D. T., instrument switch for changing from motor to generator service
0/300 scale d.c. voltmeter
Center—Handle for armature resistance control
Below. Lever scale and spring scale, with floor toggles and rocker arms extended up from dynamometer yoke.

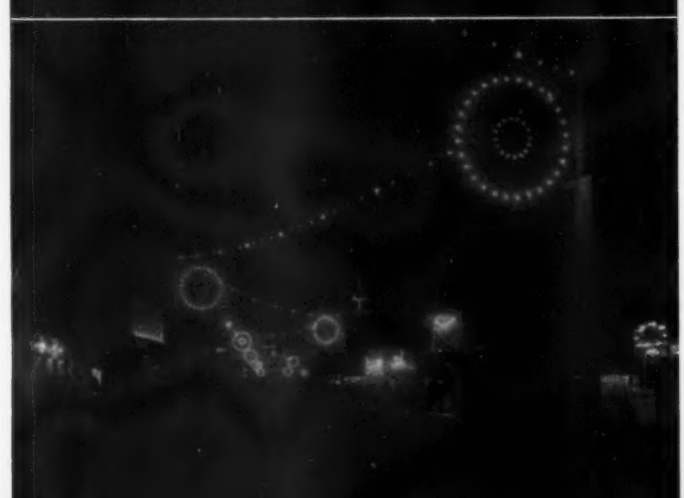
Panel No. 2. Top:
800-amp. S. P. main circuit breaker
400-amp. 2 p. main line switch
Center: 2 p. D. T., switch for changing from self-excited field to external field.
2 p. D. T., switch for switching over for reversed rotation
Below: Field resistance control lever, with inner vernier knurled knob for fine steps of speed control

At rear of board:
Auxiliary resistors on back wall for supplying an artificial generator load.
Rear-of-panel armature and field resistors.

Some Lighting Features at Great Lakes Exposition

By Dean M. Warren
General Electric Co.
Nela Park Engineering Dept.
Cleveland, O.

THE Great Lakes Exposition which opened in Cleveland, June 27 is, among other things, a lighting festival that will not soon be forgotten. Planned to give maximum nighttime effect without sacrificing daytime appearance, the illuminated displays are, in general, colorful and in some instances majestic.



1. Entrance Pylons

The main entrance pylons, seven in number and 60 ft. high, with structural steel framework and plywood covering, are square in shape, white in color and lighted by eighty-six G. E. "Exposition Floodlights." Sixty-three of these floods have red cover glasses and 750-watt Mazda lamps; the remainder have a clear glass lens and 1000-watt Mazda lamps. The red floods strike the units from the front and the whites from the rear of the pylons light the other three sides.

2. Luminous Arches and Davits

The majestic luminous arches on the left are of wood with a sheet rock covering. They are alternately painted red and white, and blue and white. Each pylon has six troughs equipped with twenty-one inside-frosted 40-watt Mazda lamps on 12-in. centers, the filaments being 8 in. from the background. Four 200-watt G. E. Handy floodlights are concealed in the top of each buttress lighting the galvanized metal fins at the top. Four open-type oxidized aluminum parabolic reflectors, equipped with 150-watt silvered bowl lamps are mounted flush with the ceiling and produce some 150-fc. under the arches. The ship's davit units on the right are outlined, with twenty 25-watt exposed yellow lamps on 6-in. centers. From the top of the davit is suspended a cylindrical glass unit with a 300-watt inside-frosted lamp. The pedestals supporting the large eagles seen at the right have troughs which appear in silhouette. In each trough are fourteen 40-watt inside-frosted lamps on 12-in. centers.

3. Corrugated Metal Pylon

A somewhat different note is struck by the twenty-four 18-ft. architectural pylons which illuminate, as well as decorate, the main east and west axis. Here polished corrugated metal formed into concave surfaces 3½ ft. wide by 10 ft. high reflects, in most interesting fashion, the light from lamps which are concealed in a channel placed in the mid-section of the element, the channel appearing in silhouette. Seventy-five-watt clear tubular lamps produce wide white bands while 40-watt natural-colored green lamps produce spike-like accents. The principal illumination is furnished by the luminous panels at the sides of the pylons. Each is equipped with twelve 75-watt inside-frosted lamps and the deep cavities are faced with sand-blasted ribbed glass.

4. Lamp Studded Circles

An application of the festoon principle are the lamp-studded circles, made of galvanized wire and studded with 25-watt lamps on 6-in. centers, white in the outer ring, colored in the inner ring. Because they are simple to make, requiring only some wire and ordinary lamp strings, these units should have considerable application for special occasions requiring a simple inexpensive design treatment.

As will be seen the Rosedale farm is typical of thousands of farms.

ADEQUATE FARM WIRING DEMONSTRATION

Through the cooperation of REA, NEMA and N.E.C.A.

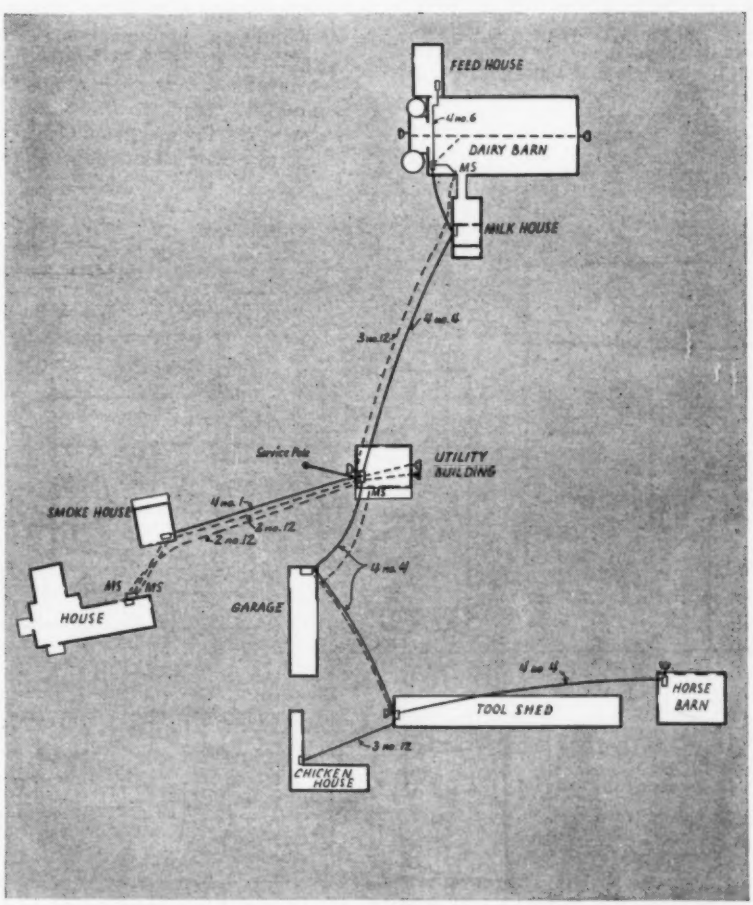
WIRED in rigid conduit, metallic tubing, armored cable, non-metallic sheathed cable, and knob and tube, the 212-acre Rosedale dairy farm, located near Herndon, Va., twenty-six miles from Washington, was opened to the public in July as a demonstration of how electricity can be used on a typical farm. This farm, which has been electrified through the cooperation of the Rural Electrification Administration, the Third World Power Conference, the National Electrical Manufacturers Association, and the National Electrical Contractors Association, is not intended as a model but rather as a demonstration farm.

This is a going farm with old buildings, the main part of the house being over two hundred years old. It was selected as being typical of thousands of farms throughout the country.

All of the buildings have been equipped for this demonstration with modern appliances to show how electricity can be adapted to the ordinary farmstead to bring modern living comforts and efficient power for farm tasks.

The farm, which will be open to the public throughout the summer, will be one of the exhibits of the Third World Power Conference to be held in Washington September 7 to 12.

By using every approved type of



Layout of farm buildings showing feeders (solid) and remote control (dotted) of flood lights and siren

Service pole from which 3-phase, 4-wire 120/208-volt service is brought into the building in four 4/0 conductors in 2½-in. conduit.

wiring the sponsors make no specific recommendations as to types. On the other hand, the electrical contractor, Harry Alexander, Inc., has made every effort to make an installation model of each type of wiring. Thus anyone wishing to install any type on a farm can see an example of the best practice with respect to installation methods and fittings for that kind of wiring.

As will be seen from the illustrations, the wiring devices and fittings, apart from those used in the residence, have a service factor that is in excess of current farm wiring practice. On the other hand, inasmuch as the wiring material was all donated and the contractor received only the cost of his direct labor, his services being donated also, it is apparent that there would be no advantage to anyone to overdo the job. Instead, all types of devices were selected with regard to serviceability in the particular location, safety to man and beast, and continuity of service.

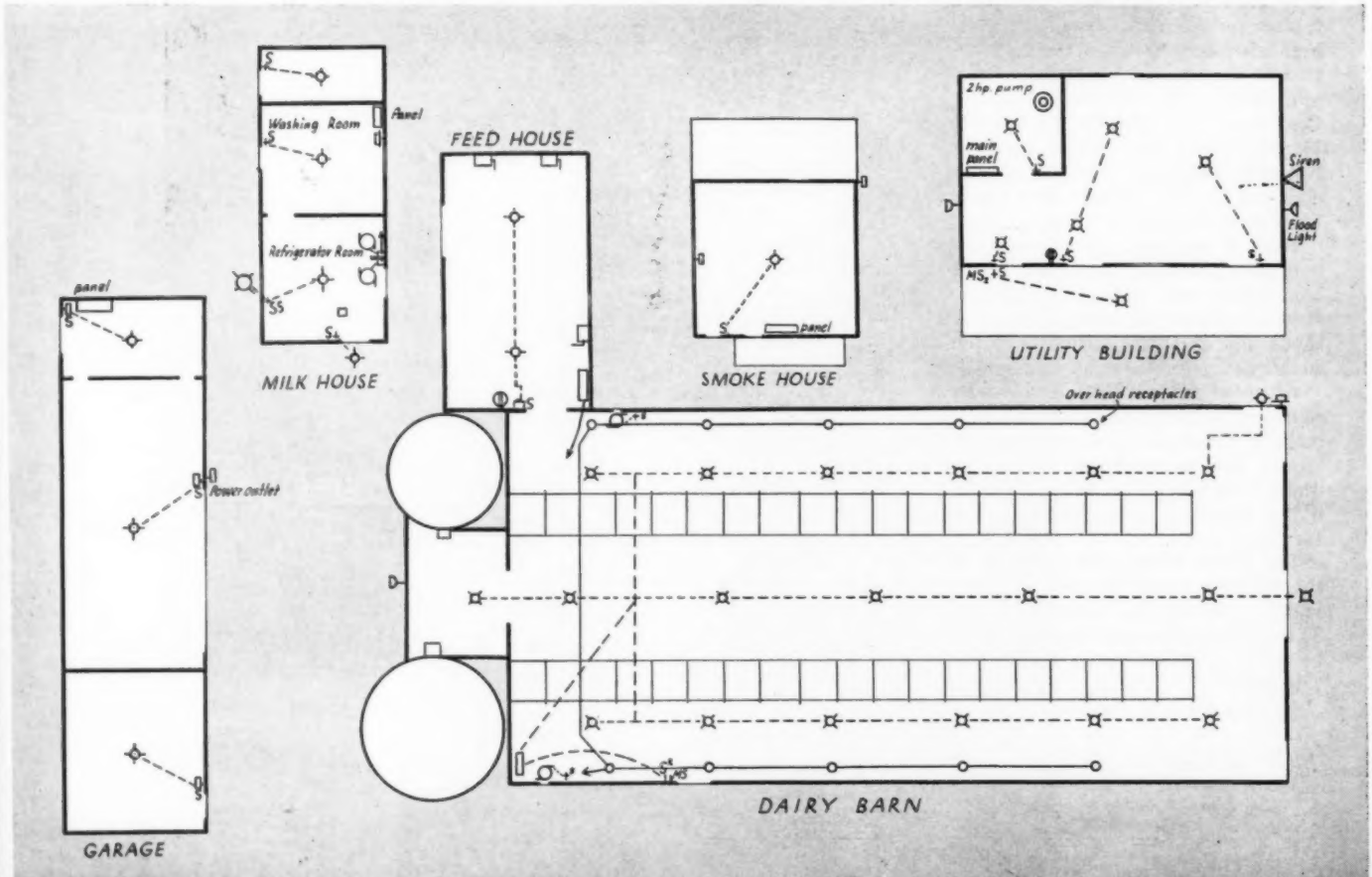
Thus in the milk house all fittings and lighting equipment are water tight, permitting daily hosing without injury to the wiring. Outdoor equipment is all weatherproof, machinery frames are grounded, power plugs are used as disconnects for a 5-hp. portable motor. Yard distribution is all underground to prevent outages from storms and other hazards. In this particular instance, it was felt that the extra cost of an underground cable job would pay for itself in eliminating the production loss that would occur if for any reason overhead lines were to come down.

Service is brought in by the Virginia Public Service Company over a 2300 V. primary to a pole mounted transformer bank located on the farm near the center of distribution. Current is primary metered. Three phase, 4-wire, 120/208-volt service is brought in to the main panel located in what is known as the utility building by four 4/0 conductors in 2½-in. conduit. From the main panel there are three underground cable feeders, one No. 4 loops to the milk house, to the cow barn with a subfeeder to the feed house. One No. 4 loops to the garage, to the shop, to the horse barn with a subfeed from the shop to the poultry house, and one No. 1 loops to the smoke house, to the main house.

The main panel as well as the branch panels in each of the buildings served are of the all circuit-breaker type.

The high line service displaced a

Electrical layout of all the farm



farm lighting set, but except for the house none of the original wiring was used. In the house, however, the original armored cable wiring after testing satisfactorily with a megohmmeter, was split and used for some of the circuits. Additional circuits in to the house, making sixteen in all, were run in armored cable and lead covered armored cable.

The poultry house was wired in knob and tube, the cow barn and horse barn in non-metallic sheathed cable, the smoke house in lead covered armored cable, the milk house, shop and feed house in rigid conduit and the utility building and garage in metallic tubing.

As will be noted from the layout, the wiring was planned with ample copper in the feeders and circuits to provide adequacy not only for today's needs but for the future, also to meet the heavy loads demanded for demonstrating purposes which far exceed normal requirements for farm operation. In the house there are six No. 12's for appliance receptacles in addition to special circuits for the range and for the water heater and eight No. 14's for lighting.

All of the buildings have an ample number of receptacles. In the cow barn for instance there is a row on each side to provide an outlet for each four stalls. The work shop has a number placed at close intervals above the bench. The same care has also been taken to provide adequate switching.

In the placement of receptacles the use factor was taken into consideration. Thus in the cow barn the receptacles are on the ceiling out of the way of the cows. In the feed house they are approximately 4 ft. 6 in. from the floor as being the most convenient height for plugging in machinery. For the convenient connection of the 5-hp. utility motor the three power outlets are located one outside the horse barn and one outside the cow barn for hay hoists, and one outside the garage for sawing logs.

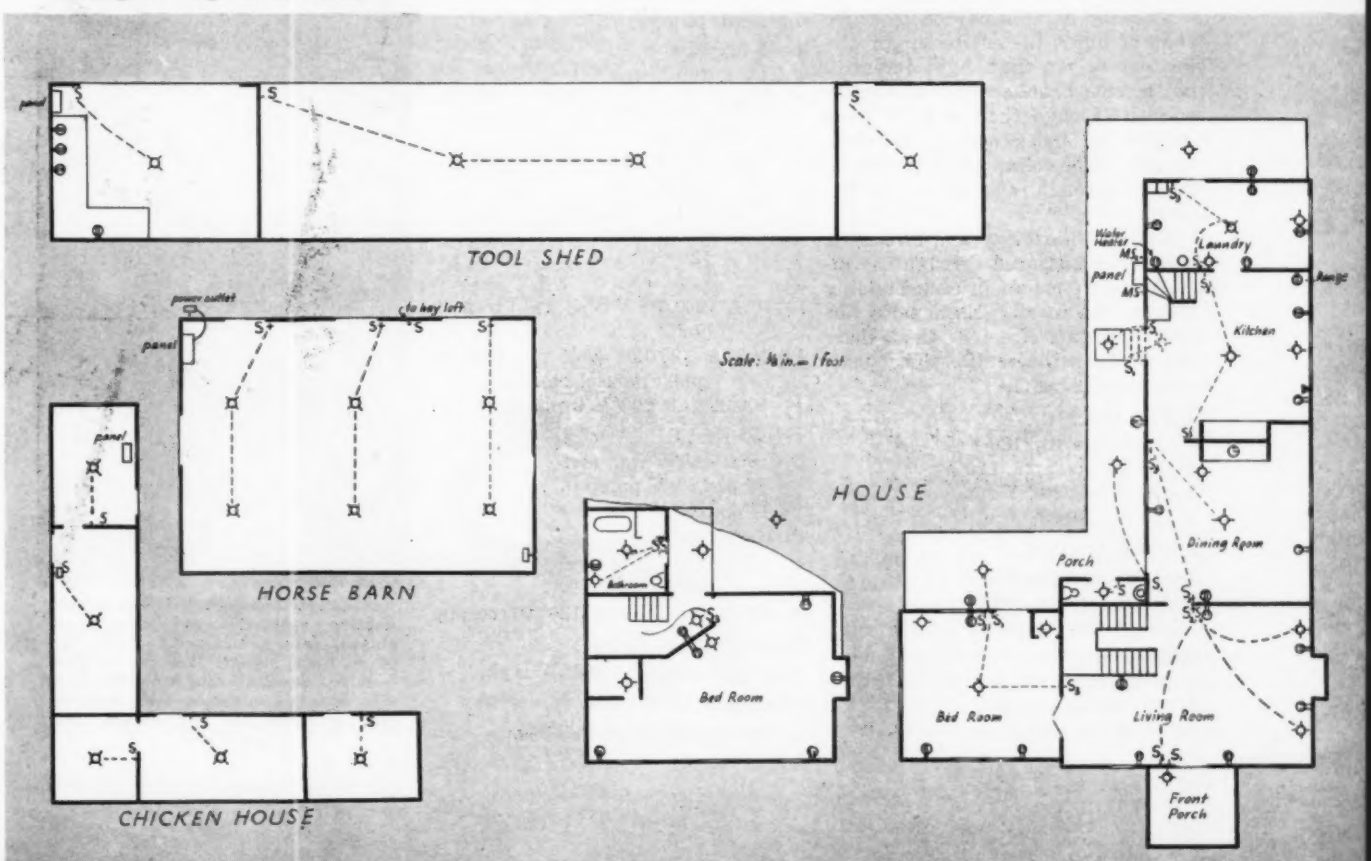
The six yard floodlights are remote controlled through a solenoid by momentary contact switches from three locations, the utility building, main house and cow barn.

A siren located on the utility building is also controlled by a momentary contact switch located at the house.

In all of the buildings except the house, the panels are located inside. The construction of the house, however, made this impractical and so it is located on the porch. To present

The main panel as well as all of the branch panels are of the all circuit breaker type. The lower compartment houses the solenoid switch for the 3-station remote control of the yard flood lighting.

buildings showing switch control



One corner of the feed house showing the heavy duty character of the wiring. The power outlet for the 5-hp. utility motor is of the spark-proof type. Switches and outlets are water proof.

an attractive appearance all the feeders to the panels are boxed in.

Because the farm buildings are subjected to frequent hosing, or the movement of hay or other objects, water-tight lighting fixtures with guards are employed. They will also keep out bugs and dust. The same reasoning was responsible for the selection of switches and receptacles.

The cow barn is lighted by three rows of lights the entire length giving not only a high light intensity but a remarkable absence of shadow as well through the use of a large number of units spaced on short centers. The lights are remote controlled through a solenoid in the panel.

Extreme flexibility and circuiting adequacy is assured through the installation of panels in each building making ten in all. Each panel has room for spare circuits. In all there are 61 branch circuits. The panel schedule follows:

MAIN HOUSE
8—15 A ckts. ltg. 120 V
6—20 A ckts. appl. 120 V
1—70 A 120/208 V range
1—20 A 120/208 V water heater

SMOKE HOUSE
1—1 hp. grinder 208 V
1—15 A ckt. ltg., etc.
1—15 A ckt. hot bed

HORSE BARN
1—5 hp. hay hoist 208 V
2—15 A ckts. ltg., etc.
1—15 A ckt. cattle fence

SHOP AND TOOL HOUSE
1—15 A 120/208 V subfeed to chicken house
3—15 A 120 V ltg., etc.
1—1 hp. lathe
1—½ hp. grinder
} 208 V 1 ph.

CHICKEN HOUSE
4—15 A 120 V ckts. ltg., etc.

GARAGE
1—1 hp. pump
1—5 hp. saw
} 208 V
2—15 A 120 V ltg.

UTILITY BUILDING
(Main panel)
2—15 A 120 V ckts. on solenoid sw. (flood lts.)
2—15 A 120 V ckts. ltg.
1—2 hp. 208 V pump
1—70 A 120/208 V 3 ph. feed to garage, etc.
1—70 A 120/208 V 3 ph. feed to milk house, etc.
1—100 A 120/208 V 3 ph. feed to smoke house, etc.
1—400 A 120/208 V 3 ph. main sw.

MILK HOUSE
3—15 A 120 V ltg., etc.
1—¼ hp. 120 V pump
1—1 hp. 208 V cooler

COW BARN
4—15 A ckts. on solenoid sw. 120 V ltg.
2—15 A ckts. direct 120 V recepts.
2—½ hp. fans
1—½ hp. milker
1—5 hp. hoist
} 208 V 1 ph.
1—50 A subfeed to feed house

FEED HOUSE
1—1 hp. sheller
1—5 hp. grinder
1—3 hp. mixer
} 208 V 1 ph.
1—15 A recept. 120 V
1—15 A ltg. 120 V

The cooperation of NEMA embraced the providing, by its member companies, of all of the electrical appliances, wiring materials and equipment installed in the residence and farm buildings. It was obviously impossible to use all of the equipment and devices offered by the member companies of NEMA, and it was, consequently, necessary to select the apparatus for this demonstration farm by drawing.

Through the cooperation of the National Electrical Contractors Association REA is able to demonstrate on this farm a wiring system adequate to meet all needs, the best practices with respect to each of the systems used, and installation methods that produce not only a neat appearing job but a practical one for the purpose. This work was assigned by N.E.C.A. to its executive committeeman for the Eastern Division, Robert W. McChesney, executive vice-president of Harry Alexander, Inc., which company donated the services of its entire organization for the necessary engineering and supervision of the installation.

For contented cows there is vapor proof lighting, ventilation and water proof outlets, ceiling mounted. While the N. E. Code permits fastening of nonmetallic sheathed cable at 4½ ft. intervals, note that in this case 1½ ft. intervals is used for permanence and appearance.

by J. O. Case
President, Quality Electric Co. Ltd., Los Angeles, Cal.

Each branch of the electrical industry had its turn at a recent conclave of the Business Development Section, Pacific Coast Electrical Association, in Fresno, Cal. Here is what the spokesman for the electrical contractors had to recommend to the utilities, the manufacturers, the wholesalers and inspectors gathered there.

I AM speaking for a group which has long been considered and referred to as the bottle-neck of the electrical industry—the electrical contractor.

Now, a bottle-neck is usually thought of as a restraining or restricting influence; as a necessary evil in the anatomy of the bottle, and this is probably the interpretation that has been applied to the term with respect to the contractor. But let's not forget that the neck also serves the very useful purpose of permitting the contents of the bottle to be dispensed; and this meaning may possibly be equally applicable to the electrical contractor.

The electrical contractor has been charged with not measuring up to his job, of being a poor merchandiser, underselling the job, etc. and unquestionably in many cases this is true. But on the other hand there are those contractors who are doing a constructive job, who recognize the shortcomings of their group and who are doing a great deal to raise the level. No one more than they realizes that conditions in their branch of the industry are susceptible of improvement and no one more fully realizes that that improvement must be self-initiated and self-attained and that artificial conditions offer no permanent possibilities. The contractor desires nothing partaking of benevolence or semi-charity, but he does need the sympathetic understanding and support of the other branches of the industry. This will go a long way towards eliminating this congestion in the neck of the bottle.

We hear on all sides that the contractor has not done a good job of selling adequate wiring. To a certain degree he is guilty as charged.

Specifically, the contractor is as genuinely concerned in seeing the condition corrected as is the balance of the industry. When the adequacy of a job is cut it isn't only the rest of the industry which suffers; the first branch to pay the penalty for this act is the contracting branch.

We can eliminate the neck with a hammer but the usefulness of the bottle is practically reduced to zero.

The competitors of the job-slashing contractor are the first ones to feel the economic results of his tactics. The point I am trying to make is that we are not your problem; your problem and ours in this case is identical, and we are as vitally concerned in its solution as you are. Let us work together in a spirit of mutual helpfulness to attain its solution.

One favorite argument advanced by utilities is that wiring costs are too high and are retarding adequate wiring progress. Many lower cost methods of wiring have appeared in the past few years but they have not had any effect upon adequate wiring. So it is quite obvious that is not the answer. After all, it is a selling job, and if this is properly done it will probably do more than anything to bring about lower prices. It was more expensive piping and plumbing fixtures that made people conscious of the desire for more plumbing—not cheaper installation.

We find utility men telling us the crying need is for adequate wiring. Almost in the same breath these same men are equally insistent that the answer is lower wiring costs. The two are not compatible. Either you are going to have adequate wiring with its necessarily proportionate cost, or you are going to have

lower wiring cost with its attendant evils about which you are now complaining. Which do you want? It cannot be both and we might as well make up our minds to that fact. Shall we do a selling job and get adequate wiring or shall we do a giving job and hold the cost down? Let's decide that point and work for its accomplishment as a unit and stop bombarding the public with arguments from the utilities in favor of lower wiring costs and arguments from the contractors in favor of lower rates.

Another obstruction in the neck of our bottle is the fact that the industry at large as well as the contractor is not sold on its own products. The old analogy of the automobile salesman driving up to his prospect with a horse and buggy certainly is true in our industry. As a specification in the redesign of our bottle let's see that this condition is corrected.

So we see at least a few of the causes contributing to the bottleneck classification of the electrical contractor. To get back to the theme—

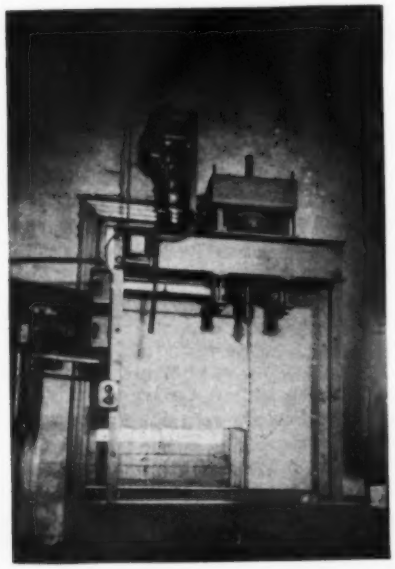
Imagine a bottle — just an ordinary, every-day bottle as representing the electrical industry. It has a rather comfortable sort of body—one which might be somewhat ashamed of its rather small neck, which we will say represents the electrical contractors. "I can get along better without that neck—it cramps my style," says the bottle, so with the hammer of intolerance and condemnation we eliminate the neck.

But now the bottle finds it much more difficult to dispense its contents properly, and its usefulness is practically reduced to zero.

Now imagine another bottle, designed and built for maximum service for the job it is to do, with a neck free from restricting tendency.

It is possible to convert a bottle having a narrow neck to one more on the order of this last bottle, but the glass must be slowly and uniformly heated, gradually expanded and with intelligent and patient manipulation worked over to the proper proportions.

If our electrical industry bottle can be constructed somewhat along the lines of this one, we will find that it is difficult to tell where the neck begins, and the electrical contractor will find that his part of the bottle contains a lot of the cream instead of just a place for the foam.



Steady-Thrust Motor-Driven Press

IN a desire to develop a press that would be free of "chatter" and that would not over-travel its stroke during the removal of stubborn bearings or commutators under heavy pressure, the Nashville (Tenn.) Armature Company, built a motor-driven worm-and-gear outfit that is said to deliver a 140-ton thrust at the stalling point of its 2 hp., 1,800 r.p.m. motor. Upon a rugged steel frame is mounted the motor and gear train that imparts a 14-in. long thrust at a speed of 9 in. per minute to a 2¼-in. diam. worm-threaded vertical steel ram. The ram operates as a non-rotating piston. No brake is used on the outfit, as a magnetic motor reversing switch control station is provided at a convenient position on the left side of the frame.

The frame, consisting of two 2¼-in. by 8-in. channel iron uprights, with a pair of 2¼-in. by 8-in. by 48-in. long head and floor sills, is

spaced to accommodate apparatus up to 6 ft. high and 4 ft. square. Two 8-in. by 48-in. horizontal channels, that are each attached to a 2-in. by 7-in. by 24-in. long, adjustable shoe, project to the front and back of the press frame for supporting two 54-in. loose cross-rails of 2¼-in. by 8-in. channel iron. The adjustable shoes fit into the webs of the vertical channels, and may be raised or lowered at 12-in. intervals by means of ¾-in. locking pins which pass through holes in the flanges of both the shoe and the vertical channels. The two 48-in. horizontal channels are each bolted to their adjustable shoes with four ¾-in. bolts. The gear train assembly rests on a 2-in. by 6-in. mitered and welded top frame-work that pulls against 3½-in. by 6-in. I-beams, through ¾-in. by 28-in. long bolts. The motor and gear train frame work is so blocked apart that it is free to be moved along the upper cross sills. A screw drive cross-adjustment for moving this entire head to place the thrust in off-center positions is now being made for the outfit.

The lower photograph of this press outfit shows at closer range the 2¼-in. by 8-in. vertical supports, the horizontal projecting channels that adjust up and down; also the 2¼-in. by 8-in. loose cross rails, one purposely laid slantwise to give a better inside make-up view. In addition to these loose members, two 4-in. by 6-in. L's, 16 in. long, are placed on the loose parallel channels as snubbing collars.

Let the Women Sell Adequate Wiring

Photo courtesy N. Y. Edison Co.

Thousands of people eagerly turn each year to home service women for help on modern housekeeping. Why not adequate wiring also?

By Mildred A. Nichols

Director of Home Economics, Graybar Electric Co., New York, N. Y.

YOU can't blame the average householder for not taking more interest in better wiring, when most of them have no idea what better wiring is. Is it, then, not up to the electrical industry to do an educational job?

One of the greatest drawbacks to doing a thorough educational job seems to be the attitude of some of the manufacturers and dealers who feel that you may kill a sale if you even suggest to the customer, when selling her an appliance, that it may be necessary for her to put in a new circuit or new outlet. They seem to overlook the fact that they may be killing all future sales if they sell her an appliance without checking up to see that it can be used conveniently and safely. Naturally she will soon find that out for herself, and not being educated to better wiring will put the blame on the appliance rather than the wiring.

Since it is admitted by all that the majority of homes are inadequately wired for the present day uses to which electricity is put, why not face the fact and combine to do everything to correct this condition?

It is moreover generally agreed that the subject of adequate wiring is definitely something of interest to the homeowner and that it is definitely tied up with appliances and lighting. So why not, as a starter, put housewiring in the Appliance Division of the industry and take it out of the Wiring Division, at least for the time being?

Let the people who sell appliances or write about appliances be the ones to sell and write about housewiring. Have the two subjects so closely related that you can't talk about one without mentioning the other.

After all, you wouldn't think of selling an appliance without a cord, and appliance cords are in the appliance division. And the best appliance in the world equipped with the best cord is useless unless the wiring in the walls is the right kind to be used with the appliance. The appliance cord is really only the connecting link between the appliance itself and its source of energy. You certainly associate gasoline with automobiles. Nobody argues that you shouldn't talk about gasoline to the owner of a car for fear of reminding him that he will have to pay for the gasoline, and he knows he must get this fuel at a service station. There is plenty of electric energy available at power and light stations—but you must have adequate wiring in order to make full use of this energy. Keeping an appliance on the shelf because of the lack of adequate wiring can be likened to keeping a car in the garage because the tank is empty.

How can we do this necessary educational work? It can't be done in a day or a year and it will take time and some money. But there are many ways of doing a certain amount of educational work through established channels at practically no cost.

Every manufacturer packs an instruction book with his products. Along with this book, there could be a small leaflet describing and picturing very simply what an adequately wired home should look like. If this leaflet were standardized by the industry and used by every manufacturer, the leaflet and its message would soon become very familiar to the homeowner.

When you consider how quickly the homeowner accepted the approved cord idea you'll admit that there is a possibility she will be just as receptive to the adequate wiring idea.

The leaflet is only one step in the educational program. A second and more important one is the cooperative work with the home service departments of the lighting companies. Many of these departments have been in effect for fifteen years and in that period the directors and their assistants have won the confidence and respect of the housewives in the districts which they cover.

The housewives have found that the information, advice and instructions given out by these women is reliable, helpful and practical. Therefore, they will listen to and believe what these home service women tell them on any subject relating to modern housekeeping.

So what more logical way could there be to spread the gospel of adequate wiring than through these well established departments within our own industry?

Now comes the question of how to do it. The same type leaflet that has been suggested as an enclosure with the appliances could be sent

to these home service departments for distribution at their classes and lectures.

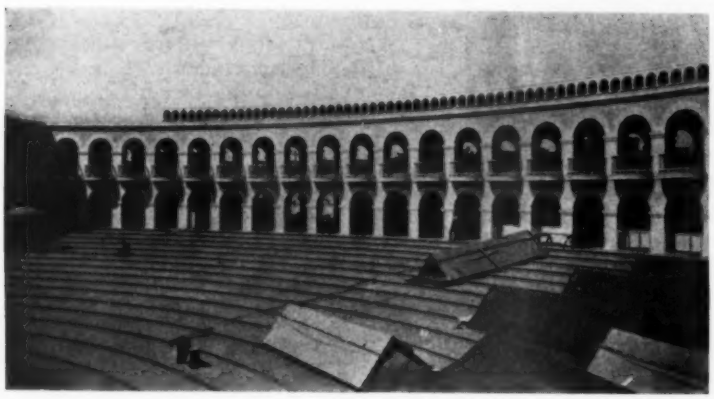
Large charts showing floor diagrams and wiring plans of the adequately wired home could be prepared by the industry. There should also be a complete set of charts emphasizing the outstanding points and requirements and a short lecture should go with these charts.

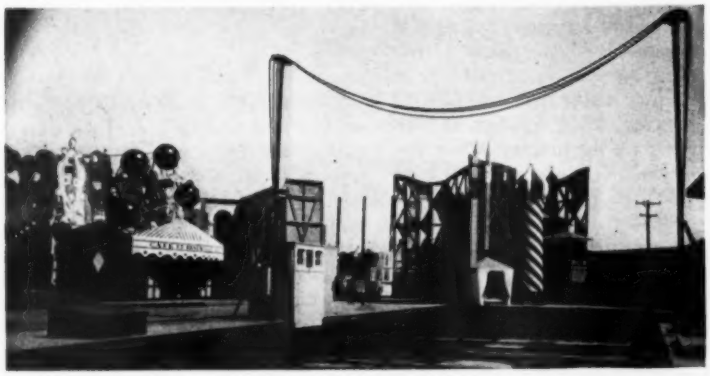
First, the home service girls should be taught the subject and shown how to give the talk. They, in turn, should train the appliance salesmen and floor girls. A special class might be held for the officials of the company. Next, this lecture could be given to the classes and groups of women who come regularly to the home service classes. It could be worked in with the cooking demonstrations logically and inoffensively.

The same material could be sent out to the Department of Agriculture extension workers for inclusion in their various projects. Electrical leagues could profitably devote meetings to this subject.

The most important thing is to have all this material standard, prepared by a non-partisan organization and concentrated on the general idea of adequate wiring rather than on any specific system or material.

The constant repetition of outstanding facts brought before the homeowner at every turn would gradually convince her that there is such a thing as "Adequate Wiring" and that it deserves consideration.

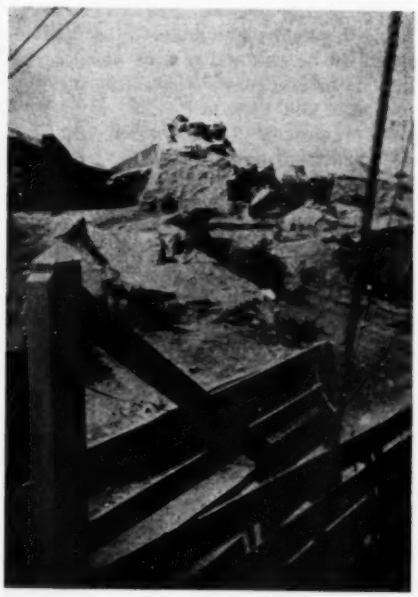




MODERN ENTERTAINMENT LIGHTING

OUTSTANDING among the entertainment features provided for the Texas Frontier Centennial at Fort Worth are: Casa Monana, an outdoor cafe-theatre, claimed to be the world's largest night club and The Last Frontier Show, in which an artificial mountain has been built as a background for a wild west dramatization and rodeo.

Heavy lighting values have been utilized for these attractions, two 1200-amp., 3-phase, 4-wire services having been installed for Casa Monana alone. The Shotts Electric Company of Fort Worth has already installed about 50,000 ft. of parkway cable in the general grounds and for these two features.



(Top) Claimed to be the world's largest outdoor night club, Casa Moñana has accommodations for 3500 persons at tables arranged on a broad expanse of terrace overlooking a revolving stage 130 ft. in diameter, upon which 250 performers appear. There are ninety-nine 1500-watt spot-floods in a semi-circular row; thirty-six 1500-watt spot-floods in the wings; sixteen 400-watt spots, and two 150-amp. and two 100-amp. arc spots for this lighting scheme. All incandescent units may be individually dimmed "black out" from three switchboard rooms.

(Bottom) The entire circular and rear portions of the 130-ft. revolving stage may be rolled back on tracks by means of a 50-hp. geared motor, leaving a canal between the circular stage and the audience. The stage is rotated about once in two minutes by a 50-hp. motor. The 750,000-c.m. overhead feeders are made flexible to permit the stage to be rolled forward Both motors are controlled within the control room in the center foreground.

(Right) The Last Frontier Show includes an artificial mountain over which stage coaches, cavalry, indians and cowboys pass before a U-shaped grandstand Concealed spots and banks of box lights eliminate shadows among the "crags", while four banks of twenty-five spot-floods provide about 15 f. c. of illumination on the outdoor mountain scene and the rodeo arena.

Price Discrimination Outlawed

PRICE discrimination for the purpose of lessening competition or creating a monopoly is declared illegal in the Robinson-Patman Act which was approved on June 19 and became effective then.

From the standpoint of the electrical contractor and the contractor-dealer, this Act presents many interesting possibilities for relief from certain sales practices by suppliers which have been considered unfair as well as for certain realignments in distribution of electrical products. Nothing definite, of course, can be said on this point until some interpretation is made either by the courts or by the Federal Trade Commission.

Under the Act it shall be unlawful to discriminate in price between purchasers of commodities of like grade and quality for the purpose of lessening competition or setting up a monopoly with certain exceptions:

1. Larger differentials for quantity purchases may be given provided the seller can show a saving in cost for an order as the result of such order and even then the added differential must not exceed such saving;

2. To move perishable, obsolete or distress goods, or to wind up a business lower prices may be charged;

3. Prices may be changed to meet market conditions and in this connection one may set up as a defense to a charge of price discrimination the necessity to meet a competitive price. In this latter case, however, the competitive price can only be met and not gone one better.

No distinction is made between buyers of different functions, such as wholesalers or retailers, although such a distinction was included in the bill as originally drawn. In deleting such distinction it seems unlikely that Congress had any intention of destroying the present distribution channels, but rather found that any mention thereof in the Act would necessitate the setting up of arbitrary standards which in themselves might defeat the very purpose of the Act. While some attorneys are already holding that all buyers of equal quality and quantity are entitled to the same price whether they be consumers or in the trade, there are others who feel that the proper interpretation is that there shall be no price discrimination between people engaged in the same line of commerce. In other words, the price for retailers shall be the same and the price for wholesalers shall be the same.

Of course, as an amendment to the Clayton Act, it relates only to interstate business and that feature of the Act is one that must be given careful consideration. If the seller sells entirely within one state and not for reshipment outside that state, such business will not come within the Act. However, if the seller has customers in more than one state, then he must be careful not to discriminate.

Not only may the seller not discriminate in price, but the buyer may not knowingly receive a discriminatory price.

Discriminations

In general this Act seems to offer possibilities for interpretation on the following practices:

(a) Direct selling to the industrial field by manufacturers and wholesalers who also sell the contractors the same class of material.

(b) The recognition of certain consumer groups with wholesale discounts by appliance manufacturers.

(c) Sales at wholesale by manufacturers and wholesalers to consumer groups at prices below which the contractor can buy the same goods from the same sources.

(d) Large consumer differentials on quantities which it will be difficult to prove are justified by lower costs.

(e) Sales by manufactuers or wholesalers for a particular building job below prices for other jobs.

(f) Sales by manufacturers or wholesalers at so-called "inside prices" to a particular contractor.

(g) Wholesale discounts for certain industrials and government agencies.

In fact the Act in many respects appears to follow the same line of thought as expressed in the distribution policy of the National Electrical Contractors Association, namely that all ultimate users are consumers and as such are not entitled to any price differentials except as earned by quantity purchases, that the contractor is entitled to a differential on like quantity purchases over the consumer, and the wholesaler in turn over the contractor.

If the Act is interpreted to allow a trade differential to the wholesaler greater than that to the retailer, there is the possibility of some distinction being made between goods purchased by a wholesaler for resale to retailers and goods purchased by a wholesaler for resale to consumers. For that reason the clarification and interpretation of this Act would appear at this time to be necessary to answer many of the problems involved in serving the industrial and building maintenance electrical market.

When contractors have lost this market it has been due to differentials which now apparently might in many cases be challenged. This may or may not solve the problem entirely to the satisfaction of the contractor. It immediately raises the possibility of a decision being made by a manufacturer or a wholesaler as to whom his customer shall be. Under the law a seller is permitted to choose his customers, although he is not permitted to choose what he shall sell them once he has accepted them as customers. Certain manufacturers may find, as some do now, that the major portion of their business is direct with industrials or other large consumers. There is nothing in the Act to prevent them from dealing with every customer as a consumer. The same situation may exist with wholesalers. One thing would appear to be evident and that is that an industrial plant which is a consumer cannot, if the interstate trade feature of the Act is involved, be accorded the wholesale discount simply on the basis of employing an electrical de-

UMI

partment. In view of the vast quantity of industrial plant purchases which are very, very small, it hardly seems likely that differentials can be justified on the basis of saving in cost.

While the Act places the burden of proof upon the ones complained against, one must not lose sight of the fact that the history of the Federal Trade Commission's rulings has been that the effect of discriminations must be direct and must be substantial. In other words, interstate commerce must be directly affected and substantially so. For that reason individual contractors and retailers may have some difficulty in making justifiable complaints that will get reasonably prompt action. A study of the Act suggests benefits which small local trading units can secure through organization into associations.

SERVICE CABLE

By Samuel J. Rosch

Manager
Insulated Products Development
Anaconda Wire & Cable Company
Hastings-on-Hudson, N. Y.

ONE of the major developments of the last five years with respect to house wiring has been the introduction of service cable. In spite of the large amount of it which is being installed, there is still considerable uncertainty on the part of members of the industry as to the characteristics of the different types and their proper application. This article will attempt without becoming technical to clear up these misunderstandings.

Service cable is made in four different types as follows:

1. SD or service drop cable.
2. SE or service entrance cable.
3. ASE or armored service entrance cable.
4. USE or underground service cable.

With the exception of USE, or underground service cable, the majority of service cable is made with a concentric bare neutral. All insulated wires are 30 per cent rubber insulated weather proof braided.

The factors which influence the type of cable to be used for a given installation are

1. Economy.
2. Whether the location of the cable may cause it to be subjected to accidental injury.
3. Whether the distance from the pole to the house would offer too large a span for the cable to enable it to be self-supporting.
4. Whether the type of residence or location is of such nature as to make the entrance by underground more desirable than by aerial cable.
5. Local regulations.

The essential differences in the four types of cable are as follows:

1. SD cable: This cable, instead of a moisture resisting and flame-retarding braid, has a weather-resisting cotton braid. It is not, therefore, listed as a "service entrance" cable but only for service drop. Rule 513-a, National Electrical Code, permits range wiring with "service entrance" cable. Also SD cable should not be used from the weatherhead down to the meter unless it is prottcted by conduit or metallic tubing.

The construction of this cable is relatively simple consisting of one or two rubber covered wires with weatherproof braid, a concentric bare neutral, then a treated paper tape with a weather resisting cotton braid over all.

The neutral conductor may be two sizes smaller than the insulated conductor only when the latter is larger than No. 8, otherwise the same size.

2. SE cable: This cable is designed for use in protected locations. Where there is a possibility of mechanical injury it must be protected by conduit or metallic tubing. It has a moisture resisting and flame-retarding braid and may be used for range wiring.

This type differs from the SD type in two particulars, one is the outer braid already mentioned and the other is the use of a special moisture seal tape instead of treated paper tape between the outer braid and the neutral.

The neutral may be two sizes smaller than the insulated conductor.

3. ASE cable: This is the only type that can be used in unprotected locations without additional mechanical protection. It is essentially an armored cable by virtue of the fact that it is generally constructed with combination of special heavy fibrous and steel covering designed to resist impact.

This is not to be confused with the tamperproof SE cable which employs a steel or copper tape over the assembled conductors. Notwithstanding the fact that it employs steel tape or copper, it must not be used in unprotected locations except in conduit or metallic tubing. While the cost of this type of SE cable is considerably less than ASE it is more expensive than the type of SE cable without steel or copper tape.

The neutral may be two sizes smaller than the insulated conductors except in sizes No. 8 and smaller.

4. USE cable: This cable differs from the others in almost every particular. It is distinctly an underground cable with several layers of protective covering to keep out moisture, acids and alkalies. This cable is not limited to three conductors but may employ any number.

Besides these essential differences between types, both the SD and SE types are made in several different constructions or styles. Since the designations of these styles differ with each manufacturer, the Anaconda designations are used in this article for the purpose of identifying the various constructions.

SD cable is made in three styles:

1. Style C for 2-conductor cable.
2. Style CF for 3-conductor cable.
2. Style CFF for 3-conductor cable with flat wire neutral.

The differences are as follows:

Style C cable has one insulated conductor with a concentric bare neutral that covers approximately 85 per cent of the insulated conductor.

Style CF has two insulated conductors but the neutral covers approximately only 65 per cent of the conductors.

Style CFF is the same as Style CF except that the neutral is of flat copper strips instead of stranded wire and in that way provides approximately a 15 per cent greater coverage.

When we come to SE cable we have seven different styles as follows:

1. Style SC for 2-conductor cable.
2. Style SC-100 for 2-conductor 100 per cent tamperproof cable.
3. Style SCF for 3-conductor cable.
4. Style SCFF for 3-conductor cable with flat wire neutral.
5. Style SCF-100 for 3-conductor 100 per cent tamperproof cable.
6. Style SCA for 2-conductor long span cable.
7. Style SCAF for 3-conductor long span cable.

The differences are as follows:

Style SC cable might be considered basic for this type. It has a single insulated conductor with a concentric bare neutral covering 85 per cent of the insulated conductor.

Style SC-100 differs from Style SC only in that a flat steel or copper strip is wound between the insulated conductor and the neutral to more effectively prevent tampering with the current carrying conductors.

Style SCF differs from Style SC only in the use of an additional insulated conductor and the fact that the neutral need cover only 65 per cent of the insulated conductors.

Style SCFF is the same as the previous cable except that the neutral is composed of flat instead of round strands, thereby permitting approximately 15 per cent greater coverage.

Style SCF-100 is the same as SCF with the tamperproof steel or copper tape between the insulated conductor and the neutral.

Style SCA is the same as SC except that the neutral is a combination of copper and galvanized steel wires for strength on long spans with 90 per cent coverage. Regardless of the conductivity of the steel wires the copper wires are of sufficient size to take care of the entire requirements of the neutral.

Style SCAF is the same as the foregoing but with one more insulated conductor.

The uses for the different types and styles of service cables permitted under the National Electrical Code are shown in the accompanying table.

Uses and Installations Permitted by the Code

Type of Installation or Use	Type of Cable											
	SD			SE							ASE	USE
	C	CF	CFF	SC	SCA	SC 100	SCF	SCFF	SCF 100	SCAF		
1. From pole to weatherhead	x	x	x	x	x	x	x	x	x	x	x	
2. From weatherhead to meter without conduit				x	x	x	x	x	x	x	x	
3. From weatherhead to meter with conduit	x	x	x	x	x	x	x	x	x	x	x	
4. One aerial cable from pole to meter with conduit	x	x	x	x	x	x	x	x	x	x	x	
5. One aerial cable from pole to meter without conduit				x	x	x	x	x	x	x	x	
6. One aerial cable from pole to meter without conduit — for extra long spans					x					x		
7. For use in locations not subject to excessive mechanical injury				x	x	x	x	x	x	x	x	
8. For use in unprotected locations and subject to excessive mechanical injury											x	
9. One aerial cable from pole to meter to range				x	x	x	x	x	x	x	x	
10. One underground cable from pole to indoor meter												x
11. For use between meter and range				x	x	x	x	x	x	x	x	
12. Tamperproof	x	x	x	x	x	x	x	x	x	x	x	
13. Highly tamperproof			x		x	x		x	x	x	x	
14. 100% tamperproof						x			x			
15. Limited to 150 volts A.C. Service	x	x	x	x	x	x	x	x	x	x	x	
16. Unlimited for voltages within scope of Code												x

Construction . . Methods . . . .

Entering Steel-Clad Columns

Numerous columns in the new San Antonio, Tex., post office are provided with sectional ¼-in. steel plates to protect their lower portion from trucks. To enter these columns with

conduits for supplying convenience outlets, Wright Bros., local contractors, installed these conduits in exact alignment with slots cut into this steel at the floor line. The looped run of conduit serves an outlet on the opposite side of the column. Because these columns are heavy H-steel, with only a thin layer of concrete fireproofing over them, this looping method was the only practical way to make this connection between outlets.

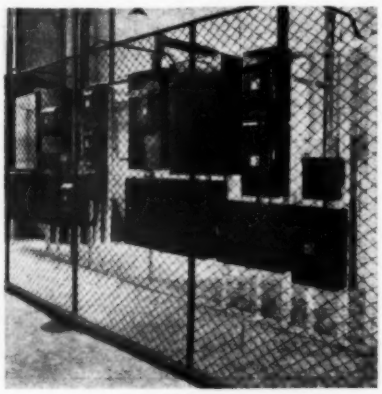
Permanent Construction for Temporary Wiring

What looks like a flooded panelboard in the foreground is actually a new 40-circuit unit which was installed to serve an additional floor in a large department store remodelling job at Atlanta, Ga. After roof concrete for the added story had been poured, the Electrical Engineering & Repair Company, Inc., cut away enough of the old temporary

roof (which looks like muddy flood water) to install the new panel at its proper distance above the rough concrete slab. When this had been done the new floor could be lighted with permanently wired ceiling lights during the removal of the false roof structure, and during the application of final floor finishing materials.

Rear-Access Distribution Center

To make an assembly of entrance and distribution switches for the lighting and power systems of an industrial plant most accessible for future changes or alterations, the Wiard Electric Company, Kansas City, Mo., arranged a steel mounting

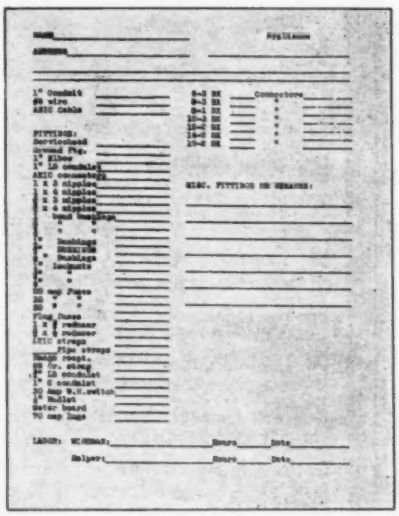


frame 3 ft. from the wall to accommodate the various pieces of equipment. A steel wire enclosure equipped with a locked door, isolates this equipment from unauthorized persons without requiring a separate room to be built. The frame was made from standard angle iron, and the pieces comprising its upper structure were welded, therefore bolts were only used at the floor sill, and in mounting the various items of equipment.

Except for the nipples that were used to inter-connect adjacent switches and metering cabinets, the principal feeder conduit runs were routed at the rear of this frame to junction boxes placed behind the various switches. This arrangement will simplify the substitution of larger switches or shifting them about later on, without requiring the removal or shortening of operative circuits. The main lighting switch (in foreground) is 400 amp., and the main power switch (rear part of board) is 600 amp. capacity.

Report Form for Range Wiring Crews

Contractors who engage in range campaign wiring have a problem in keeping accurate job records of such work with minimum office or on-the-job clerical work, therefore inexpen-



sive mimeographed forms were prepared by the Electrical Engineering & Repair Company, Atlanta, Ga., that provide an easy method of preparing such records upon the completion of each job.

The range wiring crew operates with trucks containing ample quantities of material and tools for doing

NEW CUTLER-HAMMER 30 AMP.

FRONT-OPERATED ENTRANCE SWITCH

Cutler-Hammer announces a brand-new front-operated Meter Entrance Switch Bulletin 4331-H7, with 8 "Smash-Hit" Features:

1 Everything worked from front. Mount in compact banks.

2 Do all wire pulling, conduit and mounting work from front with empty case. Then slip interior assembly into place and tighten 4 screws. Permits maximum speed, maximum ease, maximum room.

3 Completely dead-front. 2 screws hold dead-front plate in place.

4 Reinforcing rib strengthens dead-front plate, also separates branch circuit fuse compartment from main fuses.

5 Opening door pulls main switch, deadens all fuses and exposed parts.

6 Branch circuit fuses tested through test slots without interrupting service.

7 Optional solid or neutral grounding.

8 Patented C-H troughing twist-out . . . easy to remove.

Switch is 30 Amp.—2 or 3 wire—1 or 2 main fuses, with 2 or 4 branch circuits. And of course there are plenty of convenient knock-outs. You'll find a ready market for Bull. 4331-H7 in new installations and remodeling and modernization jobs. Get full information at once. CUTLER-HAMMER, Inc., *Pioneer Manufacturers of Electric Control Apparatus*, 1306 St. Paul Avenue, Milwaukee, Wisconsin.

CUTLER-HAMMER C-H SAFETY SWITCHES

UMI

YES! WIREMOLD DOES

FROM PANEL BOX TO OUTLET WIREMOLD MAKES REWIRING EASY

WIREMOLD WINDOW

WIREMOLD LUMILINE

WIREMOLD MULTI

WIREMOLD LUMILINE LAMP STRIP

Makes it easy and simple to install any combination of 12" or 18" Lumiline Lamps—mounted end-to-end or singly as desired. The illustration shows Wiremold Duplex Lampholder Base No. 1127A or B for end-to-end mounting.

STURDY WIREMOLD OUTLETS

Added as needed—Placed anywhere singly or in groups

No. 1843 Duplex Receptacle

Quick, safe, sure, trouble-proof connection for desk lamps and appliances, etc.

PANCAKE

"FLAT AS A PANCAKE!"

LISTED BY UNDERWRITERS LABORATORIES

HELP CONTRACTORS!

AND OFFERS YOU MANY BUSINESS BOOSTING INNOVATIONS!

AND PANEL STRIP

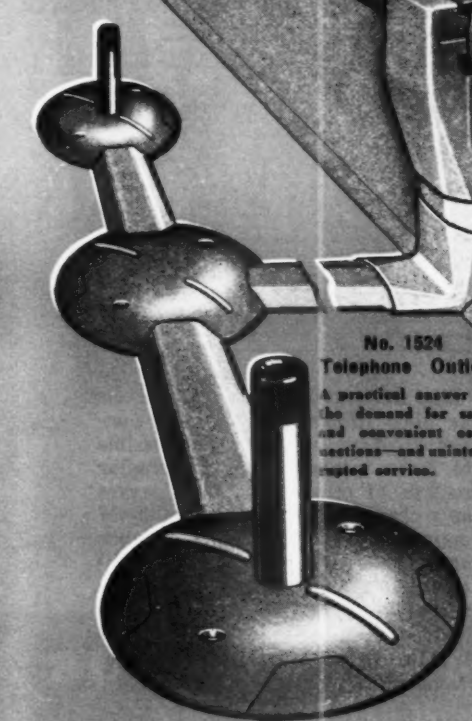
STRIP AND REFLECTOR

PLUG-IN STRIP

WIREMOLD DIRECTIONAL REFLECTOR

Provides an UNINTERRUPTED REFLECTING SURFACE, extending continuously to any distance. Illustration shows Wiremold Lampholder Base No. 1127C—a single receptacle for use at end of run—together with 1110B end fitting.

4" PLUG-IN STRIP IS EQUALLY SUITABLE FOR TELEPHONE CIRCUITS



No. 1524 Telephone Outlet

A practical answer to the demand for safe and convenient connections—and uninterrupted service.

"HALF A HEEL HIGH"
BUT PLENTY OF ROOM FOR
4 No.12 WIRES

WIREMOLD

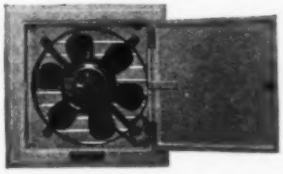
"STRONG AS A BRIDGE!"

Another Opportunity to Sell, Lease or Rent is Lost . . . *Because* . . .

People all over the country have learned that they need no longer endure the nuisance of kitchen odors, excessive heat, smoke and fumes that make the air unfit to breathe and ruin curtains, furniture and decorations. That's why so many home owners are installing ventilating fan equipment . . . why they demand it when they go out to buy, lease or rent a house.

To meet this demand, install Emerson Kitchen and Attic Ventilating Fans, in the houses you're building, and in the homes or apartments on your rental lists. Why *Emerson* Ventilators? Because they boast an enviable reputation for efficiency, for trouble-free performance and long life . . . because they're easy to install.

EMERSON Fan Ventilators for Built-in Installations



Emerson Ventilating Fans perform a dual service. They have electrically reversible motors and *draw out* superheated air, kitchen odors, greasy smoke, etc., or *draw in* cool, refreshing outdoor air. They move from 36,000 to 63,000 cubic feet of air per hour, depending upon size.

The Emerson All-Steel Wall Boxes, which are separate units, adjustable to wall thickness, may be built into the walls of homes under construction, or installed in houses already completed at small expense.

VENTILATED HOMES are Easier to Sell, Lease or Rent

This powerful but quiet Emerson Attic Ventilating Fan, when turned on in the evening, clears the house of warm daytime air and floods it with fresh, cool night air. Simple to install. Buyers decide quicker, more desirable tenants are attracted, if the homes you have to sell, lease or rent are equipped with Emerson Attic Ventilators.

Write for Folder 53-Y "How to Select Emerson Exhaust Equipment"— and the Name of Your Nearest Emerson Installer

THE EMERSON ELECTRIC MANUFACTURING CO.

ST. LOUIS, MO. *Branches:* New York • Detroit • Chicago

EMERSON ELECTRIC

MOTORS — FANS — APPLIANCES

"LEADERS IN THE FAN AND MOTOR INDUSTRY SINCE 1890"

The EMERSON ELECTRIC MFG. CO.
St. Louis, Mo.

Please send complete information on EMERSON EXHAUST and VENTILATING FANS

Name .....

Address ..... e.c.a.

CLIP AND MAIL COUPON TODAY (Pin to Your Letterhead)

EMERSON Advertising in Building Field Opens New Profit Possibilities for You!

In 1936, twice as many homes will be erected as in 1935—also double the number of homes and buildings are to be modernized. Add to this huge domestic requirement, the increasing demand for ventilation in stores, shops, and industrial plants and you have a picture of the enormous market for Emerson Exhaust and Ventilating Fans. Emerson Electric is telling the story direct to your customers, and potential customers, the architects, contractors, builders, and finance men, who will direct this work, through effective advertising in Sweet's Catalog, American Builder, and National Real Estate Journal. It will assist you in obtaining these profitable installations. Send the coupon now for complete information.

THE EMERSON ELECTRIC MFG. CO. • ST. LOUIS, MO.

several days' work. This report form is filled in to include all items of material taken from their mobile stock room, also the labor required to complete each job. Because the materials used in range wiring are limited in variety, these forms include only those items that are commonly needed, so as to avoid confusing the workmen in making out their job reports.

Plain white 8½ in. by 11 in. paper is used for these forms. Because they were inexpensive, new forms may be made up from time to time in keeping with changes in the nature of materials used.

Job Analysis Form for Checking Estimates

A prepared form for use solely in making analyses and comparisons of estimates with other similar jobs is used by Charles P. Bobe, engineer of the Paul Wendt Electric Company, St. Louis, Mo. By having

ELECTRICAL CONSTRUCTION SHEET

CHARLES P. BOBE, ENGINEER

Form 300 CPB/EC

Sh. Break-down of System — Sheet No. 1
Units of Material & Labor
Units of Cost — COMPLETE COST ANALYSIS

Sh. Lighting Circuits (_____)

ceiling	outlets				
bracket	outlets				
SP switch	outlets				
DP switch	outlets				
3w switch	outlets				
receptacle	outlets				
wall 'pn	outlets				
clock hanger	outlets				
floor box	outlets				
misc.	outlets				
TOTAL ALL OUTLETS					
feet, ½" conduit	+	outlets	=	Ft. per outlet	
feet, ¾" conduit	+	outlets	=	Ft. per outlet	
feet, 1" conduit	+	outlets	=	Ft. per outlet	
total feet	=	outlets	=	Ft. per outlet	(conduit)
feet sir. wire	=	outlets	=	Ft. per outlet	(wire)
feet sir. wire	=	circuits	=	Ft. per circuit	(wire)
feet all conduit	=	circuits	=	Ft. per circuit	(conduit)
Total material ?	=	outlets	=	per outlet	(material)
Total labor ?	=	outlets	=	per outlet	(labor)
Total cost ?	=	outlets	=	per outlet	(cost)
Total cost ?	=	circuits	=	per circuit	(cost)

Sh. Underground Lt. Service — Ft. Size

Total material ?	=	Ft.	=	per Ft.	(material)
Total labor ?	=	Ft.	=	per Ft.	(labor)
Total cost ?	=	Ft.	=	per Ft.	(cost)

Sh. Mains, Panels & Light Feeders for — Circuits

Total material ?	=	Circuits	=	per circuit	(material)
Total labor ?	=	Circuits	=	per circuit	(labor)
Total cost ?	=	Circuits	=	per circuit	(cost)

Sh. Mains, Panels & Power Feeders for — Total H.P. — (Tot. Circ.)

Total material ?	=	H.P.	=	per H. P.	(material)
Total labor ?	=	H.P.	=	per H. P.	(labor)
Total cost ?	=	H.P.	=	per H. P.	(cost)

this form available so that it can be filled in quickly upon the completion of an estimate, it is possible to make comparisions with similar records of other jobs. This serves as a check against the possibility of major errors in floor take-offs, labor or material extensions, and additions. It is furthermore a useful record for arriving at approximate estimates, where short-cut estimates

BULL DOG Vacu-Break

THE SAFEST AND MOST MODERN SAFETY SWITCH

Compact size with adequate wiring room—stylined cabinets with handles to match—doubly-sealed, doubly-safe VACU-BREAK principle of circuit rupturing—all mark this line as the most outstanding contribution to better design and quality, since the advent of safety switches.

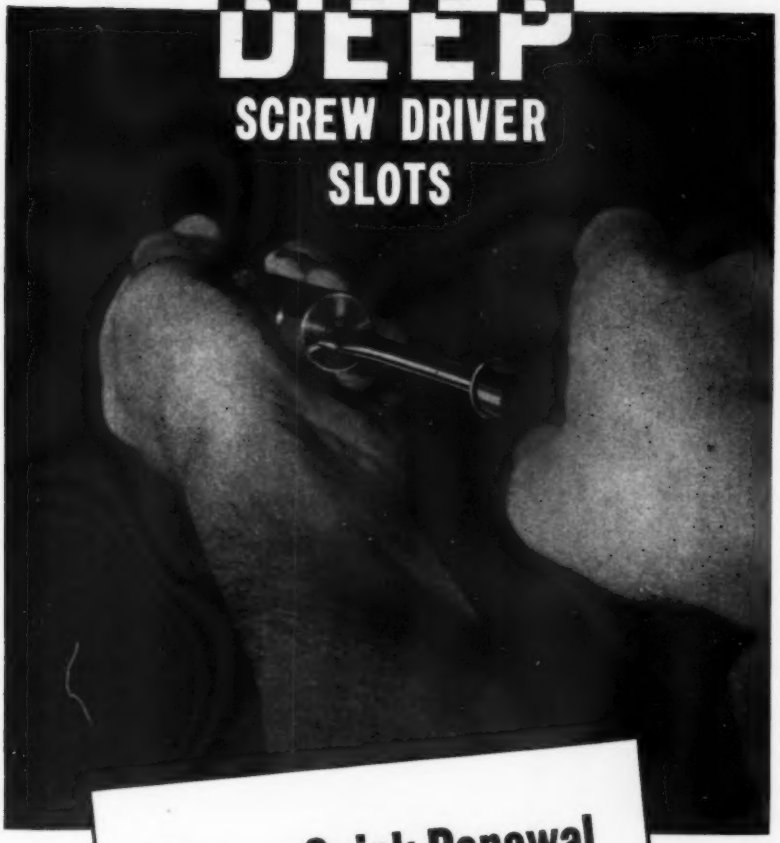
COMPLETE STOCKS MAINTAINED BY JOBBERS IN ALL PRINCIPAL CITIES

BULL DOG ELECTRIC PRODUCTS COMPANY

Manufacturers of Safety Switches, Fusenters, Light and Power Panel Boards, Switchboards, Duct Systems

BULL DOG ELECTRIC PRODUCTS OF CANADA, LTD., TORONTO, ONTARIO **DETROIT, MICHIGAN**

SHAWMUT FUSES
HAVE
DEEP
SCREW DRIVER
SLOTS



Easy...Quick Renewal Assured

The renewable fuses MUST be constructed to permit quick, easy renewal. That is why Shawmut Renewable Fuses have deep, serviceable screw driver slots, into which a screw driver can actually be inserted. Deep screw driver slots are well worth considering when buying renewable fuses, and are just one of the many superior features perfected by the Chase-Shawmut Company during their forty-five years of fuse development.

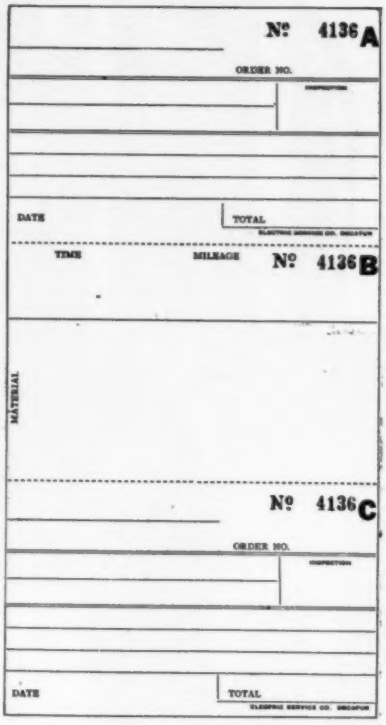
THE CHASE-SHAWMUT CO.
NEWBURYPORT, MASS.
FUSE SPECIALISTS SINCE 1893

are necessary because of insufficient time for making a take-off in detail.

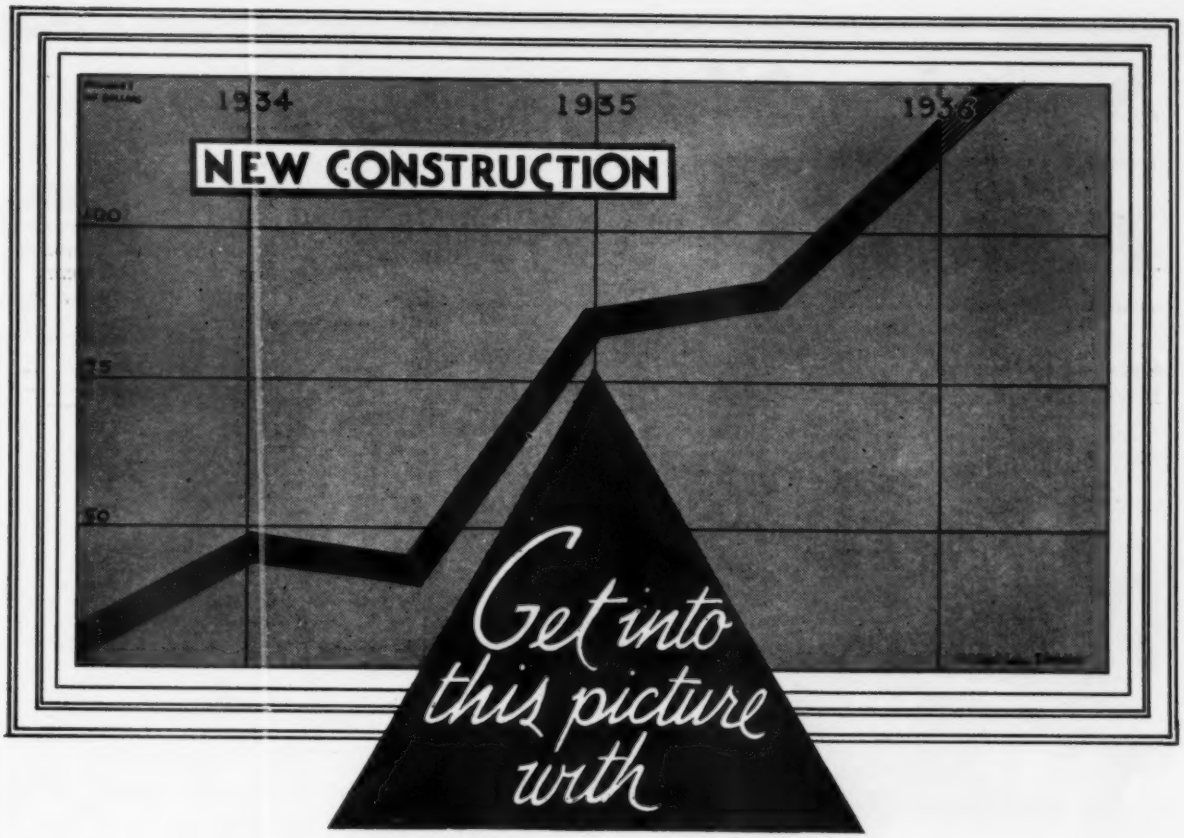
Additional forms are used by Mr. Bobe, which cover other systems, such as clocks, telephones, nurses' call, etc. These forms are a continuation of the last three comparison groups which appear above.

Pocket-Size Job Record for Coded Material Lists

By adopting a numerical index code for several hundred kinds of construction materials, the Electric Service Company of Decatur, Ga., has been able to condense its job records upon a 3-in. by 5-in. triplicate card system. Instead of writing



out detailed descriptions of materials, outside employees use numbers by memory, or by reference to an index sheet, for making up their lists of used materials. The cards are first typed in at the office, because they are all numbered serially. Upon completion form "A" becomes the numerical job record; form "B," which is the electrician's job ticket, becomes a part of the alphabetical customer file from which billings are rendered; while form "C" is the "work - in - progress" alphabetical record of permits, etc., until filed alphabetically with the form "B" "completed job" ticket.



WIRING PAULDING DEVICES

Let Paulding Wiring Devices help you to get the most out of the rising construction market.

Every new building needs wiring devices —and Paulding offers the finest at a price that makes selling easy and insures your profit.

25 years of service to the electrical industry. Quality always maintained regardless of price or business conditions.

Our plant is equipped for the complete manufacture and assembly of all parts. Why not write today for the Paulding catalog, containing illustrations and complete specifications on all Paulding products?

JOHN I. PAULDING, INC. NEW BEDFORD, MASS.

QUALITY SERVICE SATISFACTION

Service Shop . . . Practice . . . . .

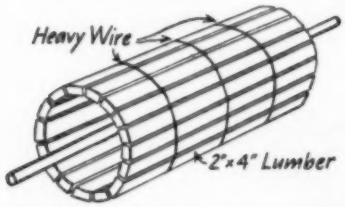
Get-at-able Magnet Wire Storage

Any desired reel of heavy magnet wire may be taken from its storage rack for use at the winders, for weighing during inventory, or for

reeling upon other partial reels without having to move, shift or lift off other reels, at the Cleveland Electric Company, Atlanta, Ga. Horizontal 4-in. by 4-in. timbers and posts of similar size have been mortised to provide for double-deck rows of standard size wooden reels. A reel may be rolled out of the bottom row without regard to the upper row. Identifying tags are tacked to the horizontal rails at the spaces for all reels.

Rotor Crating for Rough Treatment

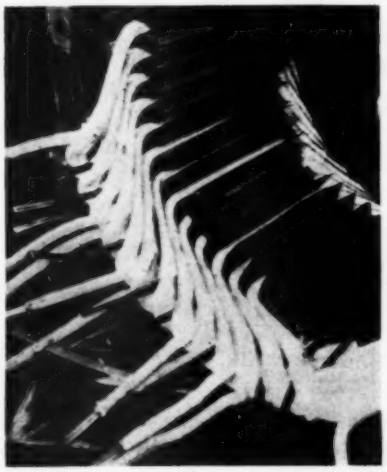
Protection against bumps, nicks and loosened connections is easily provided for heavy rotors and armatures by placing pieces of di-



mension lumber, such as two by four's, lengthwise around them, similar to barrel staves. Heavy wire is then bound around the assembly at several places to serve as hoops or bands. This method is used frequently in mine service work by the Birmingham (Ala.) Electric & Manufacturing Company. Many mine motors are located in deep shafts or at the ends of narrow inaccessible passages, and their rotors or armatures must be brought to the surface and re-installed under great difficulty. This crating method permits a limited number of men handling such apparatus roughly under unfavorable conditions, with little danger of breakage or damage.

Slot Wedges for Coil Separation

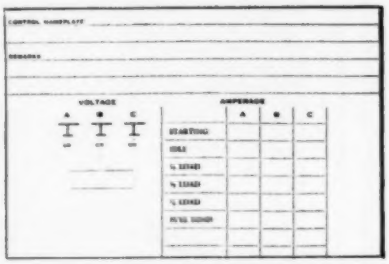
To protect abutting coils from abrasion or chafing within the stator slots, and likewise at their shoulders or over-hang, the Cleveland Electric

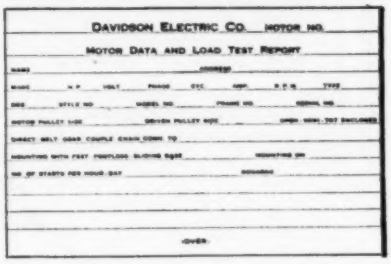


Company, Atlanta, Ga., provides strips of press-board as center wedges between the bottom and top half of coils. These strips, varying in width according to the width of the stator slots, are made long enough to finish flush with both outer points of contact between coils. The strip-ends remain concealed from view in the completed stator winding, although they provide a tough "buffer" between the adjacent coil masses.

Recording Industrial Field Tests

After purchasing an industrial analyzer to facilitate quick testing of motors for its industrial customers, the Davidson Electric Company of Brooklyn, N. Y., developed a card

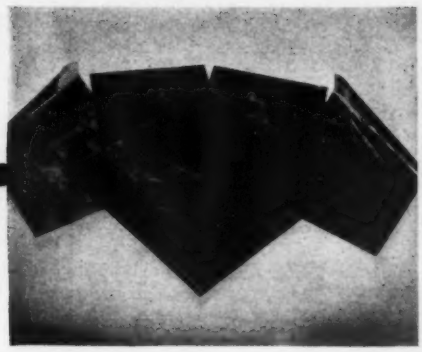


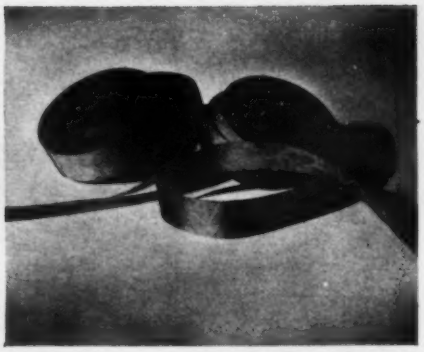


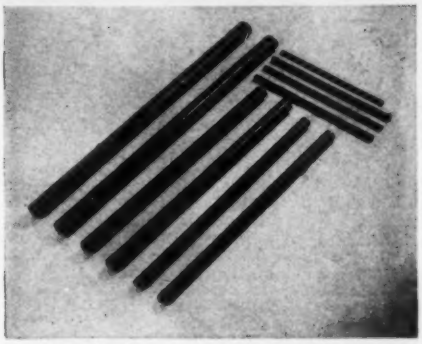
system that provides a permanent test record of each motor. These data are filled in while a test is conducted, after which a typewritten file record is made up in the office. Both sides of a 4-in. by 6-in. white card form are used for this purpose. Each motor in a given plant is assigned a plant number, and all the typed cards are placed in a file tray following a master tab bearing the customer's name.

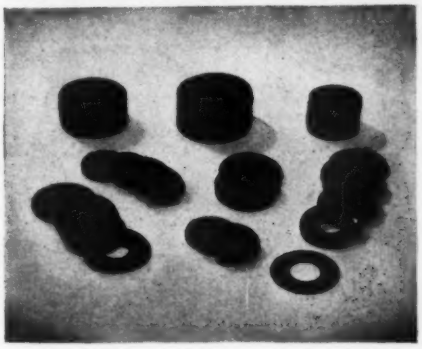
Indexed Motor Parts Reference Display

To fill parts orders quickly from a stock that covers about fifteen makes of small motors, the Wm. C. Krauth Electric Company, of Louisville, Ky., uses a battery of 65 small parts display boards. These boards are in the service department office, where the customer and service attendants alike may quickly check their requirements from viewing the actual parts item. Each display unit is made from a piece of 16-in. by 19-in. by ¼-in. beaver board, and is hinged by its edge to the wall. Stencilled index tabs which project from these boards bear the names of various manufacturers. From 15 to 20 items are fastened to one side of each









DEPEND ON GENERAL ELECTRIC MICA FOR

Uniform Quality

All Types for Your Requirements: Segment, Moulding, Heater and Flexible Mica Plates - Tapes - Composite Insulations - Tubing - Washers

The *uniform quality* of General Electric Mica is assured by scrupulous care in selection of materials and by highly exacting testing and inspection. In many cases the mica is x-rayed to safeguard against the presence of metallic particles . . . Your benefit is consistently *pure* mica . . . consistently *dependable* insulation.

The various types of G-E Mica Plate are bonded with Glyptal or shellac. Glyptal increases the resistance of the mica plate to electric arcs, to high temperatures, and to oil, and also creates greater density of the plate which results in improved electrical properties.

Get in touch with your nearest G-E Merchandise Distributor for complete information, or send the coupon today.

Section M-688, Insulating Materials Division
General Electric Company, Bridgeport, Conn.

I am interested in the following types of General Electric Mica:

Segment Plate ☐	Moulding Plate ☐	Heater Plate ☐
Flexible Plate ☐	Tapes ☐	Composite Insulations ☐
Tubing ☐	Washers ☐	

Please send full information.

Name.....

Company.....

Street.....

City.....State.....

GENERAL ELECTRIC

INSULATING MATERIALS

APPLIANCE AND MERCHANDISE DEPT., GENERAL ELECTRIC COMPANY, BRIDGEPORT, CONN.

A slight exaggeration — but the contractor's enthusiasm is understandable! Plymouth's "Slipknot Tape" is strong. It has a tensile strength of over 45 lbs. per inch—5 lbs. over government and A. S. T. M. standards!

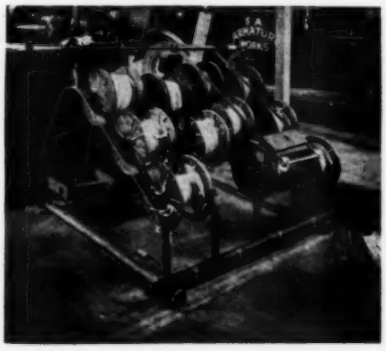
SLIPKNOT TAPE
P. R. SPLICING COMPOUND
PLYMOUTH RUBBER COMPANY, INC.
Largest Rubberizers of Cloth in the World
CANTON MASSACHUSETTS

board with small tie-wires and clips. Beside each part is a 1½-in. by 2½-in. label, which has typed on it the cost

(in code), selling price, catalogue number, and the stock room drawer number where this particular part is to be found.

Magnet Wire Payout Rack

Small quantities of magnet wire can be measured off quickly by the San Antonio (Tex.) Armature Works from a payout rack that was made up to hold twelve reels of assorted sizes of magnet wire. This rack is 50 in. square, sets on roller bearings and may be rolled over the shop floor to place any spool in line with a bench-mounted re-wind motor. When a customer orders



magnet wire, it is run off the reels in feet, according to a weight conversion chart nearby, and the orders are thus accurately filled with a minimum loss of the stock clerk's time.

This rack employs two horizontal channel bars made from a sliding door monorail. These bars support five ¼-in. by 1½-in. flat iron bows which have J-cleats welded to them to hold the short shafts upon which the reels revolve. On top of this rack is a counter weighted payout guide that may be moved to any position along the rack. The monorail bars rest on two 1½-in. pipe cross members into which mandrels are fitted. These mandrels are machined to fit old roller bearings, which act as casters.

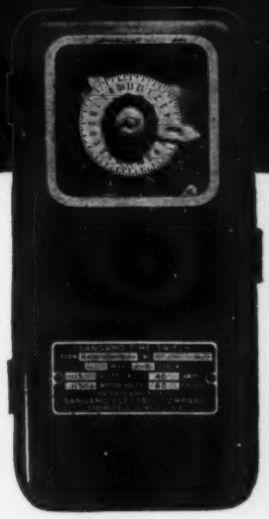
Courtesy Curtis Lighting, Inc.

. . . that makes this type of installation

COMPLETELY Automatic

Merchants recognize that store windows are their most effective form of advertising. For that reason, countless stores are prospects for Sangamo Time-Switches. Evening lighting brings increased business through additional window circulation.

But . . . you must *first* show the prospect how he can use and apply this unseen hand. Increased profits for *him* . . . for *you*---and an installation which is *completely* automatic and absolutely dependable---these are the rewards when you sell Sangamo Time-Switches.



Sangamo Form K, synchronous motor time-switch. Rated at 40 amperes, it covers a wide variety of applications. . . .

SANGAMO TIME-SWITCHES for

Display Window Lighting	Poultry House Lighting	Apartment House Lighting
Floodlighting Control	Electric Signs	Motor Control

—and many other applications where COMPLETELY automatic control is desired

SANGAMO ELECTRIC COMPANY SPRINGFIELD ILLINOIS

UMI

News

THE ELECTRICAL WO

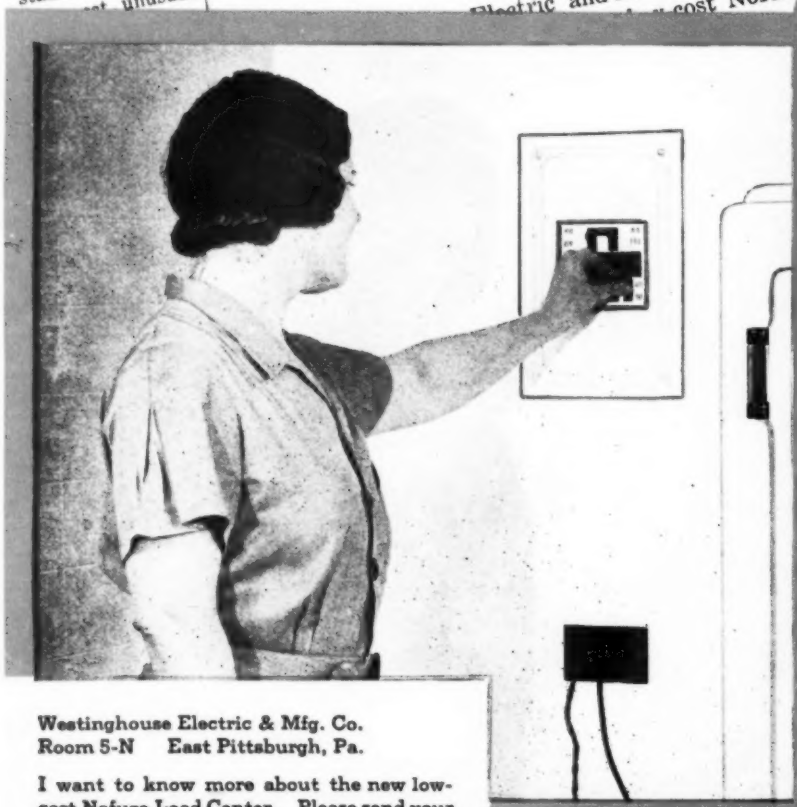
XXVI—No. 63

graphic Division, is 92 years old, otor trip through nth.
vents occurred on stand out in Mr. unusual

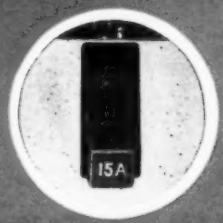
When the "man of the ho that Mr. Holm was a Westi tographer, he told him that inghouse once lived less away, and went to school which still stands across The next day Mr. Holm the Westingh building ol. In and

NEW NOFUZE LOAD CENTER FOR ONE-THIRD THE COST

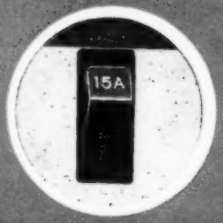
lectric and Manufacturing Co cost Nofuz



TRIP When the circuit is automatically opened the breaker handle moves to the indicating position shown above.



OFF To reset the breaker mechanism the handle is moved to the extreme "OFF" position.



ON Service is then restored by moving to the "ON" position. The breaker is trip-free and cannot be held closed against abnormal overloads or short circuits.

Because of its attractive appearance the Westinghouse Load Center can be installed in the kitchen or other convenient place.

Westinghouse Electric & Mfg. Co.
Room 5-N East Pittsburgh, Pa.

I want to know more about the new low-cost Nofuze Load Center. Please send your Catalog 29-405.

Name .....

Address .....

City ..... State .....

FOR CONTRACTORS

who are tired sharpening pencils

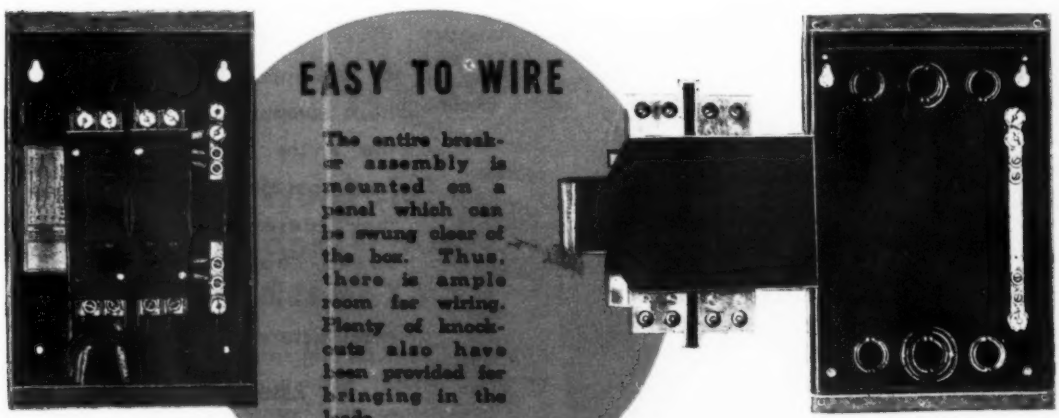
If you are tired of bidding to meet a price . . . if you take pride in being up to the minute . . . then you'll want to investigate the new Westinghouse Nofuze Load Center.

Costing only a couple of dollars more than conventional circuit protection for homes and small stores, the Nofuze Load Center is equipped with circuit breakers that automatically open when dangerous overloads or short circuits occur. Service is restored by simply moving the breaker handle to the extreme "OFF" position and then to "ON." So simple a child can operate it . . . nothing to replace . . . nothing to renew.

Put yourself in your prospect's shoes . . . the architect . . . the speculative builder . . . the homeowner. Would you be willing to pay a couple of dollars to end fuse replacements forever? You bet you would and so will they!

So get the full details by mailing the coupon. Then suggest the Westinghouse Nofuze Load Center on your next job, but be sure to get the complete story *first*.

J 60032



EASY TO WIRE

The entire breaker assembly is mounted on a panel which can be swung clear of the box. Thus, there is ample room for wiring. Plenty of knockouts also have been provided for bringing in the leads.

★

★ ★ **Westinghouse**

WESTINGHOUSE 1886 1936 GOLDEN JUBILEE

GREENLEE
PROFIT MAKERS
For The Electrical Contractor

THE greater the efficiency of the tools you use, the more chance you have of meeting competition and making a profit on each job. That is why Greenlee Conduit Benders and Knockout Tools are so popular. They cut costs on every job and are liked by the men who use them.

Hydraulic Conduit Benders

Greenlee Hydraulic Conduit Benders insure profits, because they bend conduit quicker and easier than by other methods. In addition, they make smooth, even bends, eliminating many fittings and making it easy to pull in wire and cable. They are easy to take to the job, too, because they are readily portable.

Knockout Tools

Greenlee Knockout Punches and Cutters are time savers and profit makers, because they make it easy to enlarge holes in switch boxes, cabinets, etc. They form clean-cut holes quickly and accurately, without any reaming or filing.

Other Tools

Hydraulic Pipe Pushers
Joist Borers — Bit Extensions
Electricians' Bits

Let us send complete information, without obligation to you. Just use the convenient coupon.

GREENLEE TOOL CO.
ROCKFORD, ILLINOIS

GREENLEE TOOL CO.
ROCKFORD, ILLINOIS

Please send complete information on the following:

☐ Conduit Benders
☐ Knockout Tools

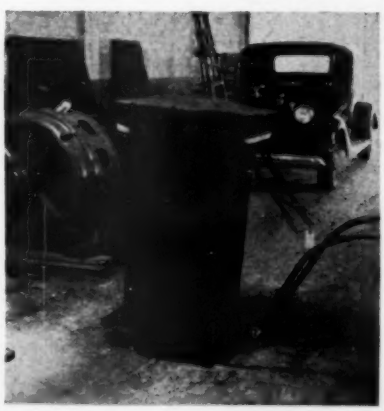
Name .....
Street .....
City .....
State .....
My Jobber is..... 8-36

Easy-to-Read Motor Labelling

All repair orders and all stock items of machinery in the A. W. White motor service shop at Oklahoma City, Okla., are provided with stamped-out tough paper identification 4-in. by 6-in. tags. This stencil-cut tag bears the shop number, date and brief description of the item and is easily readable from 8 to 10 ft. away. Because the tags bear the cut-out letters or numerals they may be left on during dipping or baking, and do not become obliterated. Duplicate tags are made when an order is written up in the office.

One-Man Scooter

Items of heavy equipment are easily handled with handle-bar scooters at the San Antonio (Tex.) Armature Works. Here a 37½-k.v.a. transformer case is shown on one of the medium-duty outfits that was made from a piece of flat steel, ¾-in. conduit, a piece of angle iron for a back-stop, and some old motor ball bearings for casters.



"PRESERVE" TIME IS *all the time*

FOR

OHIO MOTORIZED TOOL BRUSHES

The "preservation" of torque is one of the primary jobs of the carbon brushes in electric tool motors.

By preventing "proud" mica on flush commutators and keeping the entire surface clean and free from dust, dirt, chips, etc., they "preserve" the torque and speed characteristics originally built into unit by the manufacturer.

For Assured Results Use Ohio PRE-TESTED Brushes EXCLUSIVELY

THE OHIO CARBON CO.
12508 BEREA RD. · CLEVELAND, O.

A One Word Story of Friction Tape Leadership

SECURITY

...And this is not just a play upon words. You can be secure with "Security" because you get uniformly high tensile strength, electrical characteristics, and strong adhesion...at competitive prices!

United States Rubber Company

United States Rubber Products, Inc., 1790 Broadway, New York, N. Y.

Lighting . . . . . Data . . . . . .

Photoelectric Light Control

By O. P. Meaker & Dean M. Warren
Nela Park Engineering Dept.
Cleveland, Ohio

Photoelectric control is being applied to numerous artificial lighting installations to insure the maintenance of a proper illumination level under varying daylight conditions. It eliminates the faulty human factor of judging the number of footcandles available and also assures the customer that lights are not being burned needlessly.

A photoelectric relay must be installed so that the daylight falling on the light sensitive part of the device varies with the natural illumination on the working area. The daylight illumination on the working surface at the "turn off" point should be at least 5 fc. greater than at the "turn on" point. If the "turn off" point is set too low the sudden extinguishing of the artificial lighting may bring the resultant illumination down so close to the "turn on" point that the light will immediately be turned on again, or the lighting may be turned on and off so frequently that it will be distracting. The range of illumination on the cell proper must be within the sensitivity limits of the device.

To give a specific example: With one type of equipment the minimum illumination on the cell at the "turn off" point should be about 5 fc. The corresponding minimum illumination on the cell at the "turn on" point should be 2½ fc., and the maximum, 2½ fc. less than "turn off". This means that if the "turn off" is 7 fc., the "turn on" may vary between 2½ and 4½ fc. The above mentioned difference of 5 fc. in the room illumination should, of course, be maintained.

Since the operation of the equipment is entirely dependent upon the amount of light falling on the light-sensitive cell, the following procedure for measuring this light when the cell is located behind a hole in the housing is suggested. Take a light meter and place a black paper tube 2 in. in diameter and about 1½ in. long over the light-sensitive cell of the meter. Hold the meter in the same position as the photoelectric control and read the number of footcandles available. Since the light striking the cell of the light meter is proportional to that which would be received by the photoelectric tube back of a 2-in. hole in the equipment housing, an accurate footcandle setting is therefore assured.

The most favorable location for the cell is about 8 ft. from a window, facing the sky but not where direct sunshine nor direct light from a fixture will fall on the sensitive cell. It should be placed where persons moving about the room will not materially decrease the amount of light affecting the device.

General Lighting Replaces Local

These two pictures show what a remarkable improvement can be made in the working environment

of a small industrial concern through the installation of a good system of general lighting.

This system of general lighting, which was designed and installed by George W. Patterson of Patterson Electric Limited, Toronto, consists of Glassteel Diffuser units equipped with 300-watt lamps, and provides some 12 footcandles of soft, well diffused illumination over the entire working area. The units are mounted 11½ ft. above the floor and spaced 12 ft. apart.

The local system, consisting essentially of 60-watt lamps in tin reflectors hung directly over the machines, provided an apparent abundance of illumination at the tool point; but it did not reveal moving machine parts in which hands may be caught or tools on the floor which may be tripped over.

Mercury Vapor Lamp Information

High intensity mercury vapor lamps were introduced during the depression years. Because they differ quite radically in principle from incandescent Mazda lamps, both in operation and color quality of the light produced, the following comments on the two most commonly used may serve to clear up some doubtful points:

In what sizes are they made and how are they identified?

The lamps are made in the 250-watt size, designated as Type H-2, and the 400-watt size, Type H-1.

What is their maximum overall length?

The 250-watt lamp is 8 in. in length and the 400-watt, 13 in.

In what position can they be burned?

Two types of H-1 lamps are available, one for vertical base up and one for base down burning. They should not be interchanged. Base up lamps are furnished unless otherwise specified.

What are their efficiencies?

The initial lumens per watt of the 250-watt lamp is 30; of the 400-watt, 40.

How do the lamps operate?

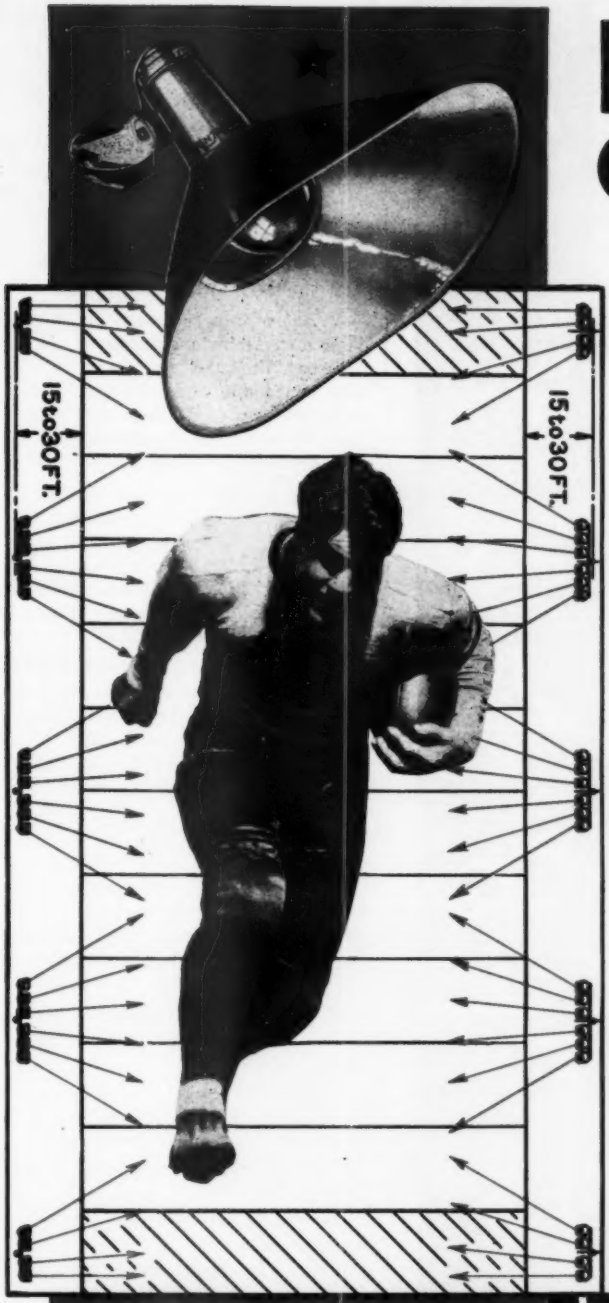
The principle of operation is that of a mercury vapor arc or a flow of current between the two main electrodes located at the upper and lower ends of the arc tube.

What is their average life?

2,000 hours.

What is the color of the light produced?

The major portion of the light is yellow-green in color, however a continuous spectrum component is also present. The balance of the light



100,000 GRID FANS *Help you Sell* FLOODLIGHTING

Night football is sweeping the country. Every school with a football team is a prospect . . . and every prospect is "live" because night games have doubled, tripled and even quadrupled attendance and gate receipts for schools playing under Benjamin floodlights.

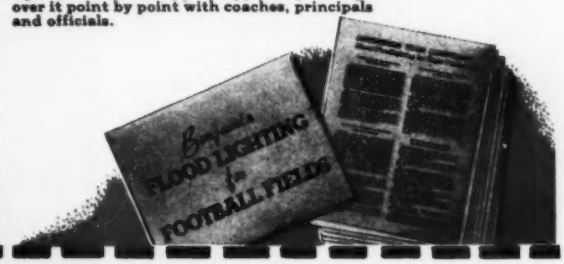
Coaches and school authorities everywhere recognize Benjamin leadership. Last season forty coaches reported average attendance increases of 261%, and more than 100,000 fans regularly attended night games on Benjamin floodlighted fields.

When you talk Benjamin floodlighting to schools in your community you have these enthusiastic fans behind you and you have Benjamin squarely behind you, too.

We have just prepared a Contractor's portfolio with photographs, attendance records, testimonials—everything to help you make the sale. And complete Benjamin Football Data sheets give detailed directions for laying out and installing the jobs.

Now is the time to contact your school officials. Send the coupon today for your portfolio. It's free and just what you need to get after this business.

● This portfolio contains the answers to school officials' questions about flood-lighting for night football games. Tells what other coaches say about it, gives their attendance records and gate receipts with actual photographs to teams in action on Benjamin floodlighted fields. Get your copy today and go over it point by point with coaches, principals and officials.



BENJAMIN ELECTRIC MFG. CO.
DEPT. EC, DES PLAINES, ILLINOIS

Please send me a copy of the Contractor's Portfolio for selling Benjamin floodlighting of football fields to school authorities.

NAME_____

FIRM_____

ADDRESS_____

CITY_____ STATE_____

BENJAMIN TRADE MARK **LIGHTING EQUIPMENT**

UMI

NOW . . . . better lighting can be had by everyone

BECAUSE OF **SIGHT-CRAFT**

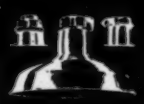
THIS SIGHT-CRAFT UTILITY LIGHT IS AVAILABLE IN 8" AND 10"—LIST $3.20 AND $3.60 F.O.B. WHSES. LOCATED IN MOST IMPORTANT CITIES.

SIGHT-CRAFT INDUSTRIAL UNITS

STANDARD DOME
Socket Type

DEEP BOWL
Threaded Neck, Type "RR"

STANDARD DOME
Threaded Neck, Type "RR"



STANDARD DOME
With Separable Fitting

Dust and Vaporproof
REFLECTORS
NEC Standard

UTILITY LIGHT
For Gardens, Industrial Yards, Garages and General Floodlighting

NOW . . . efficiency, long life, minimum maintenance and beauty . . . . AT LOW COST

NOW . . . *cash in* on the big demand for better lighting—get more jobs at *greater profit*—yet provide customers with light that *makes seeing and working easier*—with SIGHT-CRAFT. The 'VITROLUX' everlasting finish of the SIGHT-CRAFT industrial and outdoor units and the 'APOLLO' LUMINAIRE (at right) means *longer, more durable* and *more efficient service* under the most severe atmospheric and climatic conditions . . . *Investigate* SIGHT-CRAFT!

WRITE FOR CATALOG ELC-836

SMOOT-HOLMAN COMPANY
SIGHT-CRAFT
INGLEWOOD CALIFORNIA

SMOOT-HOLMAN COMPANY
INGLEWOOD, CALIFORNIA

SAN FRANCISCO
154 Eighth Street

NEW YORK
10 JONES STREET

SEATTLE
532 First Ave. So.

emitted registers at the blue end of the spectrum.

How long does it take lamps to reach full brilliancy when the circuit is closed?

A soft glow appears when the current is turned on which is increased to maximum brilliancy when the mercury becomes vaporized. Generally this requires 6 to 8 minutes for the H-2 lamp and about 10 minutes for the H-1 lamp.

What will extinguish the arc?

A current interruption or, for the 250-watt lamp, a voltage drop of 15 per cent; for the 400-watt lamp a voltage drop of 10 per cent with an auto-transformer auxiliary, or a 6 per cent drop with a reactor ballast.

How long does it take the lamp to restart after an interruption?

H-2, 3 to 5 minutes; H-1, 7 to 8 minutes. These values are for lamp in open air. Reflectors or supplementary incandescent lamps may increase the restart time.

In the event of a current interruption what precautions must be taken?

None. The current may be left on and the lamp will start of its own accord after the proper temperature and pressure have been reached.

Do the lamps require auxiliary equipment?

Yes. The lamps require either individual reactors or auto-transformers. Successful and continued operation of the lamps depends on their proper design.

Can a group of lamps be operated from a single reactor or a transformer?

No.

Can the auxiliary equipment be centralized in a bank, or installed on columns near the switches?

Yes.

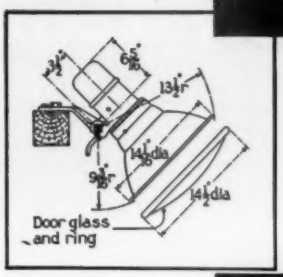
Is there any advantage to such an installation?

Yes. The appearance of the installations is improved materially, particularly that of offices, display rooms, etc.

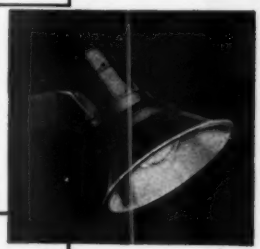
What are the recommended combinations with incandescent Mazda lamps?

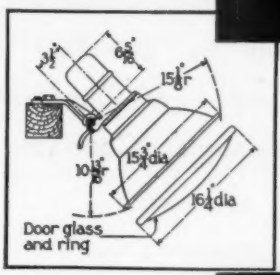
For offices and other areas where a natural appearance of colors is important, equal lumen combinations are suggested. This requires about twice as much wattage in incandescent lamps as in mercury lamps.

For industrial areas, etc., where the natural appearance of colors is not so important, the more economical equal wattage combinations are recommended.

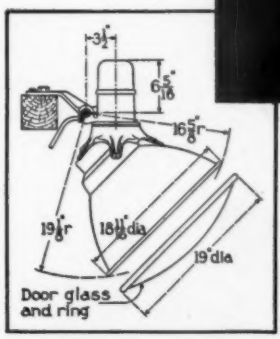


Type AL-49
300/500 watts





Type AL-43
750/1000 watts



Type AL-48
1500 watts

Save This Page

(or send in the coupon)

IT GIVES ORDERING INFORMATION ON THE NEW G-E LINE OF ALZAK ALUMINUM FLOODLIGHTS

GENERAL ELECTRIC offers three new floodlights particularly suitable for lighting sports fields and service stations. The reflector forms its own casing; it is made of aluminum, which itself is weather-resisting; since it is treated by the Alzak process, its coefficient of reflection is greatly increased, and the surface is hardened to make permanent this high reflecting quality.

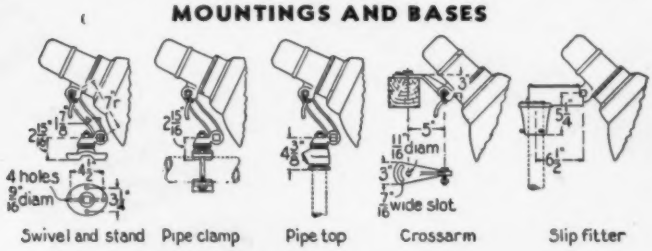
Wattage ranges from 300 to 1500; the beam is wide when diffuse (satin) finish on the reflector is used; medium when finish is specular (polished). Focus is fixed. Four feet of cable are included.

LIST PRICES

Wattage	300/500	750/1000	1500
Type of floodlight	AL-49	AL-43	AL-48
Open-type floodlight with crossarm mounting, as illustrated, and diffuse Alzak reflector	$16.00	$20.00	$23.00
Additions to Above List Price			
For door glass and ring	$6.00	$11.00	$15.00
For specular reflector instead of diffuse	5.00	6.00	7.00
For mounting other than crossarm			
Swivel and stand	1.00	1.00	1.00
Pipe clamp: 1-in. to 2-in. pipes	1.00	1.00	1.00
Pipe clamp: 2-in. to 3½-in. pipes	1.00	1.00	1.00
Pipe top: 1½-in. pipe	1.00	1.00	1.00
Pipe top: 2-in. pipe	1.00	1.00	1.00
Slip fitter (internally wired): 1½-in. pipe	2.00	2.00	2.00
Slip fitter (internally wired): 2-in. pipe	2.00	2.00	2.00

Discounts can be supplied by any distributor, or by your nearest G-E office. The above prices are list, and do not include MAZDA lamps; they do include transportation to the nearest freight station. Prices subject to change

MOUNTINGS AND BASES



Swivel and stand | Pipe clamp | Pipe top | Crossarm | Slip fitter

SUGGESTED ORDER FORMS

If you have information on catalog numbers, as found in our floodlighting catalog (GEA-1865B), order by the proper number. If not, order by description, filling in the blanks below or sending this information to the nearest office of the G.E. Supply Corp., of any other G-E distributor, or to the General Electric Company.

Quantity.....Mounting.....
Type AL-.....Door glass.....( ) with; ( ) without
Wattage.....Reflector.....( ) diffuse; ( ) specular
List Price.....

GENERAL ELECTRIC

General Electric, Dept. 6A-201
Schenectady, N. Y.

Please send me a copy of GEA-2357 on G-E Alzak aluminum floodlights.

Name.....
Street.....
City.....*State*.....500-187

UMI

TO HELP YOU BUY—

— leading manufacturers will give you d in Electrical Contracting's forthcoming A

The new Buyers Reference Number* of Electrical Contracting is now being completely revised and brought up to date.

Many manufacturers will supplement their listings in the new Buyers Reference with further details and illustrations of their products, catalog data, lists of branch offices, warehouses, etc.

Consult this valuable data when planning, specifying or buying — you will save time and money.

ELECTRICAL CONTRACTING
330 West 42nd St., New York, N. Y.

*The Buyers Reference will be published as part 2 of December Electrical Contracting

UMI

detailed information on their products
Annual Buyers Reference Number

A PARTIAL LIST OF MANUFACTURERS WHO HAVE ALREADY RESERVED SPACE:

ACKERMAN-JOHNSON CO.
ACME ELECTRIC HEATING CO.
AIRCRAFT MFG. CO.
ALLEN-BRADLEY CO.
ALLEN CO., L. B.
AMERICAN BLOWER CORP.
AMERICAN BRASS CO.
AMERICAN STEEL & WIRE CO.
AMERICAN TRANSFORMER CO.
ARROW-HART & HEGEMAN ELECTRIC CO.
AUTOMATIC ELECTRIC MFG. CO.
AUTOVENT FAN & BLOWER CO.
BECKER BROS. CARBON CO.
BENJAMIN ELECTRIC MFG. CO.
BETZ BROS., FRANK S.
BLACK & DECKER MFG. CO.
BRYANT ELECTRIC CO.
BURNDY ENGINEERING CO.
CALEBAUGH SELF-LUBRICATING. CARBON CO.
CHICAGO EXPANSION BOLT CO.
COLT'S PATENT FIRE ARMS MFG. CO.
CONTINENTAL ELECTRIC CO.
CO-OP ELECTRIC SUPPLY CO.
COUCH CO., S. H.
CRESCENT INSULATED WIRE & CABLE CO.
CURTIS LIGHTING INC.
DANTE ELECTRIC MFG. CO.
DECELECO INC.
EDWARDS & CO.
FAIRBANKS MORSE CO.
FEDERAL ELECTRIC CO.
FULLMAN MFG. CO.
GENERAL ELECTRIC CO., BRIDGEPORT, CONN.
GENERAL ELECTRIC CO., SCHENECTADY, N. Y.
GENERAL ILLUMINATING CO.
GRAYBAR ELECTRIC CO.
GREENLEE TOOL CO.
GRUBER BROTHERS
HART MFG. CO.
HAZARD INSULATED WIRE WORKS
HEINEMANN ELECTRIC CO.
HERWIG CO.
HOSKINS MFG. CO.
HUDSON CO., ALEX R.
IDEAL COMMUTATOR DRESSER CO.
JEFFERSON ELECTRIC CO.
KATO ENGINEERING CO.
KILLARK ELECTRIC MFG. CO.
KIMBLE ELECTRIC CO.
KLEIN & SONS, MATHIAS
KRUEGER & HUDEPOHL
THE LEW FITTINGS CORP.
LITTLEFUSE LABORATORIES
MARK & CO., CLAYTON
MARQUETTE ELECTRIC SWITCHBOARD CO.
MATTHEWS CORP., W. N.
McGILL MFG. CO.
MICA INSULATOR CO.
MINERALLAC ELECTRIC CO.
MISENER MFG. CO.
MOTOR CITY ELECTRIC CO.
NATIONAL CARBON CO.
NATIONAL VULCANIZED FIBRE CO.
NOMA ELECTRIC CO.
OHIO CARBON CO.
OKONITE CO.
OVERBAGH & AYRES MFG. CO.
PAINE CO.
PARTRICK & WILKINS CO.
PASS & SEYMOUR, INC.
PLYMOUTH RUBBER CO.
QUADRANGLE MFG. CO.
RALCO MFG. CO.
RATTAN MFG. CO.
REFLECTOR & ILLUMINATING CO.
RELIANCE AUTOMATIC LIGHTING CO.
RODALE MFG. CO.
ROEBLING'S SONS CO., JOHN A.
RUBY CHEMICAL CO.
SHAKEPROOF LOCK WASHER CO.
SHERMAN MFG. CO., H. B.
SIGNAL ELECTRIC MFG. CO.
SILVEY PIPE BENDER CO.
SIMPLET ELECTRIC CO.
SOLA ELECTRIC CO.
SORGEL ELECTRIC CO.
SQUARE D CO.
STEEL & TUBES INC.
STURTEVANT CO., B. F.
SUNDT ENGINEERING CO.
SUPERIOR INSULATING TAPE CO.
THOMPSON & SON CO., HENRY G.
TRIANGLE CONDUIT & CABLE CO.
TRUMBULL ELECTRIC CO.
UNITED STATES RUBBER PRODUCTS, INC.
VAN CLEEF BROTHERS
WAGNER ELECTRIC CORP.
WATERVLIET TOOL CO.
WATSON-STILLMAN CO.
WEBSTER ELECTRIC CO.
WESTERN FELT WORKS
WESTINGHOUSE ELECTRIC & MFG. CO.
WIREMOLD CO.
WOLVERINE TUBE CO.
WURDACK ELECTRIC MFG. CO., WILLIAM
ZENITH ELECTRIC CO.

When planning, specifying or buying, always refer first to the Buyers Reference Number for data—you will save time and money!

UMI

Code Chats . . . . .

Questions and answers relating to the interpretation of the National Electrical Code . . .

Conducted by F. N. M. Squires

Chief Inspector New York Board of Fire Underwriters

Cutout Boxes in Cellars

Rule 806-h states that when overcurrent devices are installed in locations exposed to moisture they shall be mounted in cutout boxes approved for the conditions.

It seems that the average cellar is exposed to moisture, yet I could find no boxes listed by Underwriters' Laboratories that were approved for damp places, except weatherproof boxes. One metal box company wrote me that standard enameled or galvanized boxes were used in cellars.

The average, ordinary cellar is not considered a damp location. And especially so the height at which a cutout box is installed on the sidewall is not considered a damp location. Therefore, inspection departments do not require the weatherproof type of cutout boxes when installed in cellars.

A cement or concrete floor below the outside ground or street level is often considered damp but this does not mean that the whole space above the floor is damp.

Where Exit Lights Are Required

Rule 4101-c states, "Emergency illumination shall be deemed to include all required exit lights and all other lights specified as necessary to provide sufficient illumination."

Where can you find out what these required exit lights, and all the other specified lights, are? I could find nothing in Code that states where they should be installed.

Rule 3601-c requires that in theatres, including motor picture houses, "Emergency illumination shall be installed * * *."

Outside of this requirement the Code does not attempt to say where or when emergency lighting shall be required. It was not thought to be within the province of the Code to make such requirements as this is generally the duty of the government whether municipal, state, or otherwise.

Then, as explained in 4101-a, when such emergency illumination is required by the Code Rule 3601-c or by the municipal, state, or other Codes, the installation shall comply with Article 41.

High Tension Wires Within Reach

Where mounted on insulators the conductors, according to 3809-e, shall be so placed as not to be subject to mechanical injury. Does this mean they shall not be placed so as to be within reach?

Rule 3809-e does not require the high tension wires to be out of reach when installed indoors; but Rule 3809-d, for outdoors work, does make such a requirement unless the wires are enclosed in a raceway or otherwise suitably guarded.

INSPECTS OIL FIELD WIRING: An unusual safety problem for Oklahoma City, Okla., is its forest of gas and oil well derricks that have recently been brought in throughout a large part of its residence section. W. L. Thomas, chief electrical inspector, has kept a close check on the electrical work that is installed at all new operations, in order to prevent gas explosions. Each drilling rig requires an extensive lighting system around the machinery and to the top of the steel towers. Some wells are drilled entirely with electric motors totalling 500 h.p. and more. Vapor-proof lighting outlets run in rigid conduit are provided on the derrick, and after a well is completed the outlets are made explosion proof.

Common Grounding

There is some question as to the permissibility of using either a No. 6 or No. 8 bare wire in conduit or cable armor for a common ground, also as to the reasons for a No. 4, if bare, exposed. Is not the extra size required for capacity rather than mechanical reasons, in as much as a common ground must act both as a system ground and a raceway or equipment ground?

The question here is, when, how, and where a common grounding conductor may be used. This refers to using the same grounding wire for grounding the neutral of the supply system as for grounding the interior equipment, including conduit and cable armor.

Rule 908-h permits the use of a common grounding conductor provided there is at least one other ground on the supply system and providing that the grounding conductor is large enough to satisfy 908-l. This means, then, that the grounding conductor shall be at least a No. 8 wire or ¼-inch brass or copper pipe.

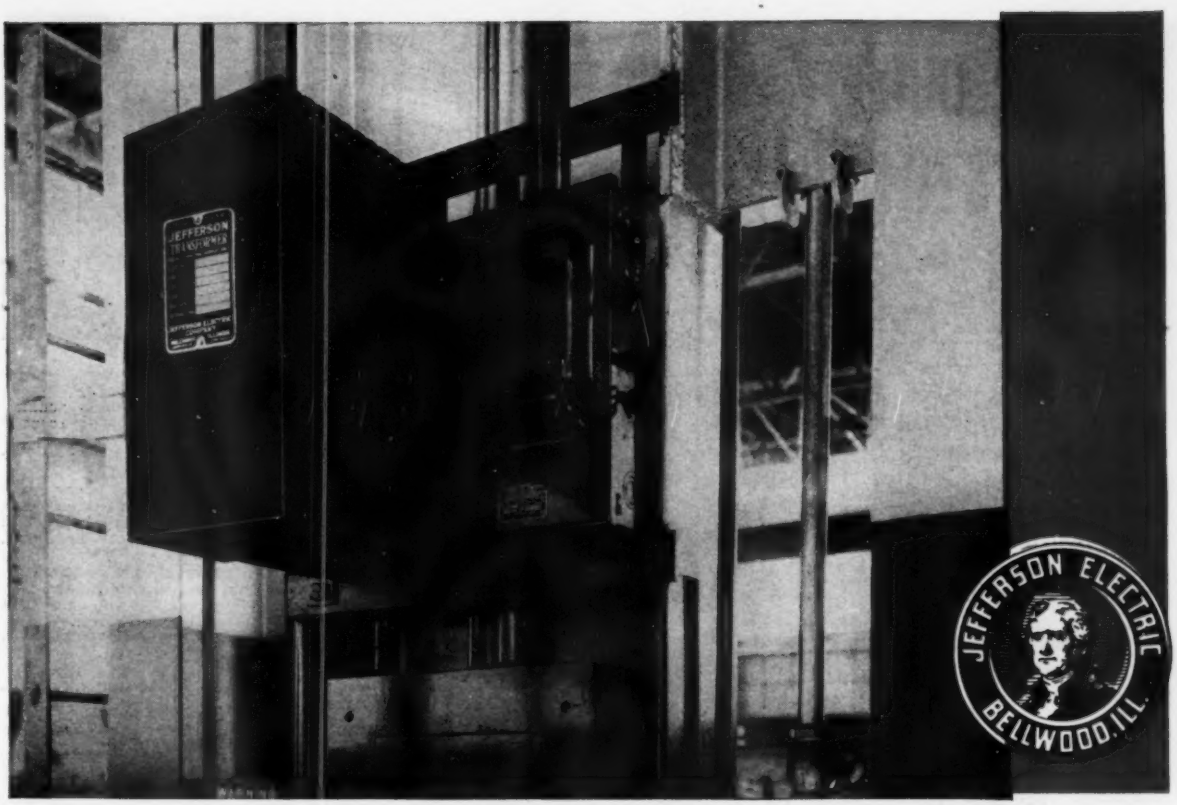
If a wire is used it may be either insulated or bare. If the grounding wire is No. 8 or No. 6 it must be in conduit or cable armor. If No. 4 or larger it need not be protected unless subjected to severe mechanical injury.

The size of the wire is determined solely by the carrying capacity requirements rather than for reasons for mechanical strength. But, when size of No. 4 wire is reached then the mechanical strength is considered sufficient to take care of all except severe conditions.

Service Entrance Cable Application

The electrical inspector here allows the use of A.B.N. cable for service entrance to meter and from meter to service switch, but will not allow it to be used from the main line service switch to electric range or lighting panel. What does the Code require on this cable? Can conduit service from point of entrance be run through accessible attic? This, of course, would be run through attic and exposed down outside rear wall.

The type of cable mentioned by our



20 Jefferson Air-Cooled Transformers In Big Diesel Plant

• • • *Supply 110-Volt Current at Power Rate*
• • • *Save Copper and Duplicate Wiring*

A leading Diesel plant uses 440-Volt three-phase power for its motor-driven equipment, but for its lights, fans, drills, heaters, blue print machines and similar small equipment 110-Volt single-phase current is desirable.

To provide this low voltage current 20 Jefferson Air-Cooled Transformers (up to 15 KVA) were installed in various parts of the plant, connected to the *lower cost* power circuit. Besides cutting down the electric bill they save thousands of feet of duplicate copper and conduit which would otherwise be required.

In your plant too, Jefferson Air-Cooled Transformers will repay the investment many times over. Install them wherever you need 110-Volt service for lights on or near machines, and for tools, heaters, etc.

Write for Bulletin No. 341-PCT containing all information. JEFFERSON ELECTRIC COMPANY, Bellwood (Suburb of Chicago), Illinois. Canadian Factory: 535 College Street, Toronto.

JEFFERSON Air-Cooled Transformers

UMI

REDUCE EXPLOSION RISK

in

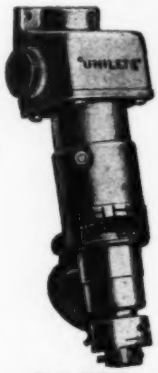
Gas or Dust-Filled Rooms

■ With Appleton Explosion-Proof Unilets on duty in all hazardous locations, there is no possibility of electrical detonation of gas or dust. These fittings insure safe wiring, protect your workmen, and *materially reduce insurance rates.* Appleton Explosion-Proof Unilets are approved by the Underwriters' Laboratories.

Malleable iron construction insures maximum durability and long wear. Cadmium coating resists corrosion and rust.

Write today for Bulletin 1003 that presents valuable information on this important type of wiring. There is no charge and no obligation.

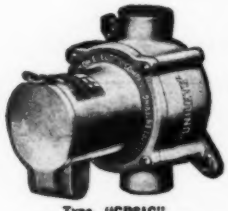
Type "EVA" Explosion-Proof Lighting Fixture (100 and 200-Watt)



Type "CEBT" Explosion-Proof Receptacle Equipment Complete with Type "CPH" Plug

MDS Series Explosion-Proof Unilets

Type "EFSC" Motor Control Push Button Station



Type "CPSIC" Unilet Complete with Lift Cover (Closed)

Sold Through Wholesalers

APPLETON ELECTRIC COMPANY

1704 Wellington Avenue, Chicago, U. S. A.

New York—76 Ninth Avenue
San Francisco—655 Minna St.
Los Angeles—340 Azusa St.
Detroit—7621 Woodward Ave.
St. Louis—420 Frisco Bldg.
Atlanta—541 Whitehall St., S.W.

APPLETON

Explosion-Proof

UNILETS

Reg. U.S. Pat. Off.

BUSY INSPECTION FORCE: The electrical inspectors of Fort Worth, Tex., are on the jump this year with permits running above any period since 1930. The Frontier Centennial wiring, plus school jobs and residences, have required a temporary inspector on the staff. E. L. Kenderdine (left) is chief inspector. He is president of the Texas chapter of I.A.E.I. (southern section) and active in a drive for state legislation. With rural electrification under way in Texas, there is a need for state-wide regulations to govern wiring that is done beyond the jurisdiction of the various cities. J. A. Luttrell (right foreground) is a permanent deputy inspector, while D. E. McKee (center) was drafted to help out during the rush period.

correspondent is that of a service entrance cable of a particular manufacturer. Being a type S.E. cable it may be used for service work and may be used between the meter and service switch as well as to the meter. Rule 513-a permits the use of service entrance cable for electric range circuits provided the cable has a final non-metallic outer covering.

Range circuit work, however, is the only place where the bare neutral type of service entrance cable may be used for interior writing, so S.E. cable would not be permitted as a feed to the lighting panel. It should also be borne in mind, that service entrance cable, S.E., but not service drop cable, S.D., may be used for range circuits.

The service equipment, that is the service switch and service fuse, should be located as near to the point of service entrance as possible, which in this case is indicated as being in the attic. If the service equipment is not to be located in the attic in this case, then the service could not enter at that point nor could it be run through the attic. If the service equipment is in the attic and the feed to the lighting panel is protected by accessible fuses at that point the feed then may run through the attic and down the outside wall. But all of the conductors of the feed must be fully insulated and the so-called bare neutral would not be permitted beyond the service equipment except for the range circuit.

to Obtain Profitable Contracts

ELECTRICALLY • WELDED •

● Apartment buildings, such as those shown above, offer a profitable field to contractors—if the contract is secured at the right figure and if the materials used permit the contractor to make money at that figure.

Genuine ELECTRUNITE Steeltubes—the pioneer and original electric resistance welded electrical metallic tubing—is the ideal and economical raceway for wiring in structures of this type as well as in all kinds of buildings. It is fully approved, it provides adequate protection, it is long lasting,, and, with all necessary fittings, it costs less to buy and to install.

No threading is necessary—three simple fittings adapt it to any job. It is light in weight, easy to handle, easy to cut and bend. Its patented knurled inside surface makes wire pulling approximately 30% easier. And an even, non-flaking galvanized finish resists corrosion.

Figure genuine ELECTRUNITE Steeltubes in your next bid. It costs no more than imitation brands. Its low cost and ease of installation will help you to obtain profitable contracts just as it has done for other contractors all over the country.

See Sweet's catalog, ask your wholesaler for figures or write us.

Knurled inside finish available in ½", ¾" and 1" sizes

Electrical Division

Steel and Tubes *Inc.*

WORLD'S LARGEST PRODUCER OF ELECTRICALLY WELDED TUBING

CLEVELAND . . . OHIO

SUBSIDIARY OF REPUBLIC STEEL CORPORATION

Patent No. 1,962,876

ELECTRICAL CONTRACTING

S. B. WILLIAMS, Editor

More Inspectors

WHEN building fell off and permit fees touched bottom, city after city cut its electrical inspection forces to the bone. Since then building has taken a decided turn for the better, but how many cities have kept pace by increasing the number of electrical inspectors?

There have been some additions to inspection staffs, but in general it will probably be found that inspection departments today are undermanned. To determine to what extent this exists ELECTRICAL CONTRACTING will conduct a survey.

In the meantime, it is not too early to begin talking about the necessity for providing for more inspectors in the next year's budget. If there are too few inspectors now to give the contractor the service he is paying for, think what the situation will be next year with a substantial improvement in business.

Labor Supply

IS THE electrical construction industry finding any labor shortage and if so is it becoming more acute? There apparently is a difference in point of view, because the March *Journal of Electrical Workers and Operators* stated that there is no shortage of skilled labor in the United States, while reports from contractors in a growing number of cities state the opposite to be the case.

There can be no question but what there are a great many electricians still unemployed, but to what degree are they skilled and are the skilled ones available to contractors where work is plentiful?

Men who were never very good have through idleness lost much of what skill they once had. Others have added a few more years to the wrong side of their useful life as skilled mechanics. In some cities these men are now the only available surplus labor and this condition is spreading with the pick-up in construction.

Labor may feel that it has a duty to return its members, good or bad, to employment before making any attempt to recruit its ranks through apprentices. Labor should not forget, however, that it has a responsibility to itself as a movement. For years it has sold organized labor as the best kind of trained labor. A storekeeper could not make much headway if he insisted on selling all of his slow moving and obsolete stock before replenishing with new and up-to-date wares. We must begin to recruit our labor forces through apprentices.

Adequate Farm Wiring

THERE is a wide difference between the adequacy of the wiring in the REA demonstration farm in Virginia and the wiring of the average REA financed job. Of course, a demonstration project would naturally be more complete than an ordinary farm, but even so the very difference shows how poorly equipped the normal farm is to secure all of the advantages of electrical service.

Of course, REA has been on the job only a little over a year, and in that time only a small amount of money has actually been spent. However, considerable progress has been made in ironing out problems concerned with line construction standards.

These lines, however, no matter how well constructed, will be of little practical value unless the farmer can have the kind of service that REA has been picturing to him. This means first of all adequate wiring.

It is not enough to say that the wiring shall comply with the National Electrical Code. It must be sufficient to take care of today's needs and those of the future. The farmer is not going to buy all of his electrical equipment at one time. He is going to add pieces from time to time and he must be able to use them without getting into trouble.

Apparently REA has no real conception of this problem. From the administrator down, the REA people freely state that they want good

work done by competent contractors using approved materials. Still they are willing to leave the amount of wiring up to the farmer.

The industry should supply REA with some guides to adequate wiring. The house part has already been worked out, but the other farm buildings present a far different situation. With such guides the representatives of the cooperatives could be of greater help to the farmer in planning his wiring.

Adequate wiring today will mean an increased usage tomorrow of electrical service and electrical equipment.

—◇—

Rewiring Economy

SYNCHRONOUS motors, automatic switches, lighting equipment and other material can be used in modernizing an industrial plant and show definite dollars and cents economies. But can wiring?

Those who specialize in industrial electrical work know that a revamped wiring job with larger feeders and more flexible layout will pay dividends to the owner, but can they prove it in figures?

Such proof-data is almost entirely missing today and it is badly needed. If one hundred good industrial electrical contractors were each to undertake to survey the economic facts of but one of their industrial rewiring jobs and the entire one hundred were brought together in one place, there would be available a fund of selling information that would stimulate rewiring tremendously.

Is it too much to ask a hundred or even fifty industrial contractors to help in making such a study? Who will volunteer?

—◇—

Higher Lamp Wattage

AS A direct result of the Better Light-Better Sight activity the trend is definitely toward the use of larger lamps. In 1933 the average wattage per lamp, exclusive of street lighting and miniature, was 58.2 watts. In 1934 it was 58.7 and last year it had jumped to 60.4 watts. The 100-watt and 150-watt sales are increasing much more rapidly than the sales of the 15 to 60-watt sizes.

From the standpoint of adequate wiring these figures are most significant. At the rate shown in the above figures the 1936 average should be near 64 watts which would mean a 10 percent increase in three years.

With so much of the wiring now loaded to the limit, it is obvious that without additional copper the illumination effect of the increased wattage is going to be much less than was expected. Each addition to the load increases the voltage drop with the result that the light output is decreased to an even greater degree.

Lack of sufficient wiring should not be allowed to hamper the work of those who are promoting lighting and appliances. Good wiring is so necessary to the success of load building campaigns that it should be given immediate attention by the entire industry.

—◇—

State Association Trend

A DEFINITE trend toward the organization of strong state associations is in motion. Many of these organizations have paid secretaries doing the field work.

For several years local contractor association work, outside of NRA Code administration, has, with a few exceptions, been almost non-existent. Now that building is improving the men are taking a greater interest in cooperative activities. They feel that with the return of better business there is a greater opportunity to do things of a constructive nature.

The state associations present an excellent opportunity to coordinate local activities. One of the weaknesses of local association work has always been the lack of a definite program. The urge to organize is there, but the men do not always know just what they want to do. Give them a program that they can carry out and help them with direction and much can be accomplished.

There are instances of excellent achievement by state associations with the right kind of secretaries. What they have done others can and will do, and so we look forward with pleasant anticipation to the results to be had from the trend to state associations.

UMI

N.E.C.A. News..

Material for this department is supplied by the headquarters staff of the

National Electrical Contractors Association

420 Lexington Avenue, New York, N. Y.

President	Vice President	General Manager
E. N. Peak	Louis Kalischer	Laurence W. Davis
1606 West Main St.	17 Bergen St.	420 Lexington Avenue
Marshalltown, Ia.	Brooklyn, N. Y.	New York, N. Y.

Plans for Atlanta Convention

The program committee for the Thirty-fourth Annual N.E.C.A. Convention to be held at the Atlanta Biltmore Hotel, Atlanta, Ga., on Monday, Tuesday and Wednesday, October 12, 13 and 14, is planning to fill every session of the convention with discussions of vital problems affecting the contractors' business. Business sessions will be held mornings as well as Monday and Tuesday afternoons. Wednesday afternoon will be devoted to an outing at the East Lake Golf Club, made famous by Bobby Jones. A delightful program of entertainment for the ladies is being arranged by the Atlanta entertainment committee, under the chairmanship of J. M. Clayton.

Members of the N.E.C.A. have been invited to register their willingness to present in short talks their views on some particular subject from their own experience, or report on any interesting activity in their locality. Any contractor having in mind a matter he would like to present to the convention in a 5 or 10 minute talk is requested to advise the N.E.C.A. office so that the related subjects may be grouped on the program and time allotted for general discussion.

As the result of numerous inquiries from manufacturers, arrangements have been made for assigning the exhibit rooms on the mezzanine floor of the hotel for manufacturers exhibits.

Atlanta, capital of Georgia, situated 1050 ft. above sea level, is famed for its points of interests including Stone Mountain on which there has been started a gigantic memorial carving, many historical places connected with the Civil War, and many examples of interesting old colonial homes.

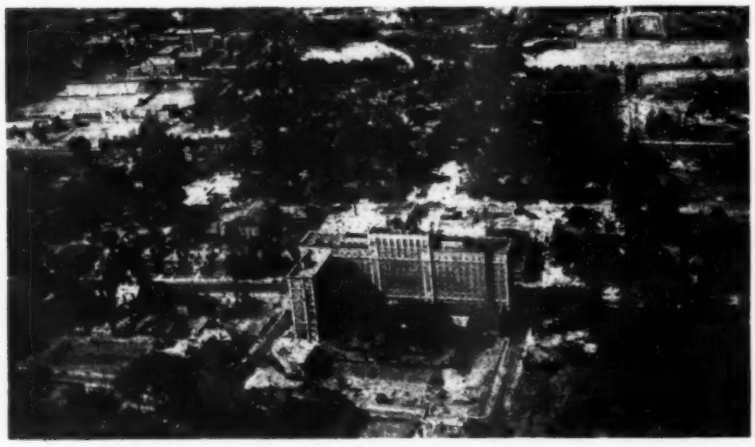
Executive Committee Quarterly Meeting

The mid-summer meeting of the Executive Committee, N.E.C.A., was held at Mackinac Island, Mich., during the week of July 19th.

In order to provide for more even division of the country in representation on the Executive Committee through election of committeemen at the coming convention in October, the committee has proposed the adoption of an additional Pacific Northwest Division as an amendment of the redivisioning plan adopted by the committee at its meeting last March. With this additional division amendments to the Constitution will provide the following representation:

Division	1.	Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut.
Division	2.	New York, New Jersey.
Division	3.	Pennsylvania, Delaware, Maryland, District of Columbia.
Division	4.	Ohio, West Virginia, Kentucky.
Division	5.	Virginia, North Carolina, South Carolina, Georgia, Florida, Tennessee, Alabama, Mississippi.
Division	6.	Michigan, Indiana, Illinois, Wisconsin.
Division	7.	Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas, Colorado.
Division	8.	Arkansas, Louisiana, Oklahoma, Texas, New Mexico.
Division	9.	California, Nevada, Arizona.
Division	10.	Washington, Oregon, Idaho, Montana, Wyoming, Utah.
Division	11.	Eastern Canada: Ontario and Provinces east.
Division	12.	Western Canada: Manitoba and Provinces west.

An amendment of the Constitution is proposed to provide for election of committeemen under a plan whereby the terms of office of four members will expire annually in 1937, 1938 and 1939 and elections from each group will be for three-year terms thereafter. The committee approved a rearrangement of the present Constitution and By-Laws to provide a better grouping of its provisions including amendments adopted by the Association from time to time but without any changes in substance other than editorial arrangement and renumbering. This revised form will be sent to the membership for consideration prior to action upon it at the annual convention.



Aerial View of convention hotel and surrounding country

Job Protection Contracts

The following resolution has been adopted by the N.E.C.A. Executive Committee:

WHEREAS, It has been brought to the attention of the Executive Committee of N.E.C.A. that job protection contracts are being abused by overloading, and

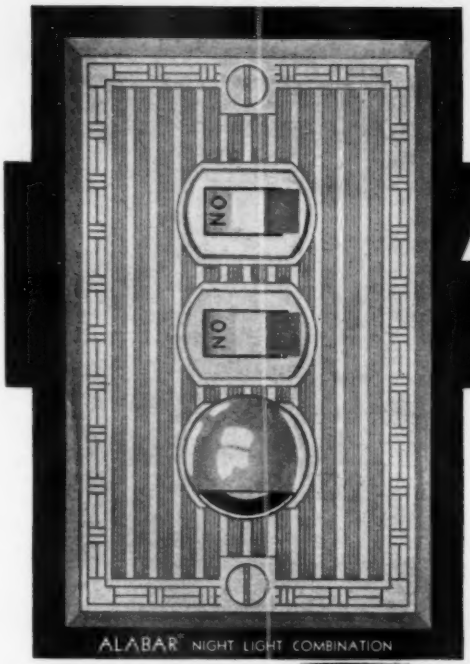
WHEREAS, This is a violation of the Pledge of Cooperation which is a qualification for membership in N.E.C.A., and

WHEREAS, This may result in violation of the laws governing price discrimination, as well as tending to demoralization of competition,

THEREFORE, BE IT RESOLVED, That members of this Association should recognize that job protection contracts are intended to cover only their requirements for a specific job and should include only sufficient material for that particular job and the contractor should sign such contract only when the proper quantities are specified;

BE IT FURTHER RESOLVED, That the contractor should cooperate with the manufacturer and/or his agent by furnishing all necessary data and information to substantiate the quantities named in his contract;

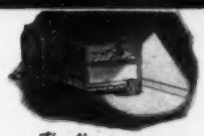
BE IT FURTHER RESOLVED, That copies of this resolution be sent to all members of this Association ad-

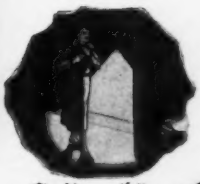


Here's a Replacement Unit for

AN AMAZING MARKET

The Bedroom


The Nursery


The Upper Hall

The Lower Hall

The Bathroom

no extra wires to run

Here's a night light or path-of-light unit that can be installed as a replacement proposition—no boxes to install—no extra wires to pull.

Simply remove the existing single pole or three-way switch—replace with a P&S-Despard switch of corresponding type—assemble with it a P&S-Despard night light and single pole switch to permit individual control of night light.

This trick is accomplished by utilizing the low resistance of the cold tungsten filament in the fixture controlled by the old switch. It's only one of the many wiring schemes possible with the P&S-Despard Line of Flexible Wiring Devices.

***All P&S-Despard wiring devices are available in ALABAR (Ivory), a cream tinted, molded material of unsurpassed beauty—smart appearing and modern as tomorrow—P&S-Despard ALABAR (Ivory) wiring devices offer the contractor a real opportunity for increased sales—and GREATER PROFIT.**

The P&S-Despard Line is manufactured by PASS & SEYMOUR, Inc., makers of complete lines of wiring devices for specification and residential applications.

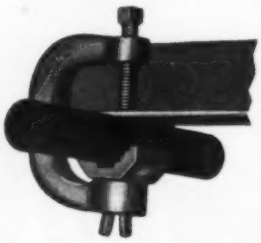
PASS & SEYMOUR, Inc.
Syracuse, N. Y.

• An illustrated folder containing detailed information and wiring diagrams of the night light combination will be sent upon receipt of your request—write for it today!

P&S-DESPARD LINE

NO. 480 "BULL DOG" ARMORED CABLE SUPPORT

A new lightweight, strong clamp for supporting or hanging cable to steel framework. Permits hanging from any angle. Best and most economical way of temporarily or permanently installing armored cable in buildings of steel construction.



NO. 470 PIPE OR CONDUIT HANGER

Pipe support can be turned freely, permitting pipe to run parallel, or at right angles to beam. Eliminates drilling or use of straps. Will accommodate sizes of ½", ¾" and 1" pipe to steel beams ⅝" thick.

Fullman also offers Insulator Supports, Fish Wire and Conduit Benders.

Fewer Man-Hours with FULLMAN

To get the greatest possible profit out of the rising construction market, install "Latrobe" floor boxes and wiring specialties. Simple, trouble-free construction saves man-hours and insures profit on every job.

Write for the complete Fullman catalog and price list.

NO. 330 "LATROBE" TOM THUMB UTILITY OUTLET

For use in wood installations, and other locations free from moisture or mechanical injury.

FULLMAN MFG. CO.

LATROBE, PENN.

The one great pocketbook of practical electrical work

Use this book for :

- Practical suggestions for locating motor troubles—
- Quick methods for correcting both motor and generator troubles—
- Clear directions for proper installation of motors and generators—
- Explanations of fundamentals of practical electricity—
- Hints on efficient operation of motors and generators—
- Helpful data on transformers—
- Pertinent information on distribution problems—
- All the details the practical man needs on wiring for light and power.

Just published—4th edition

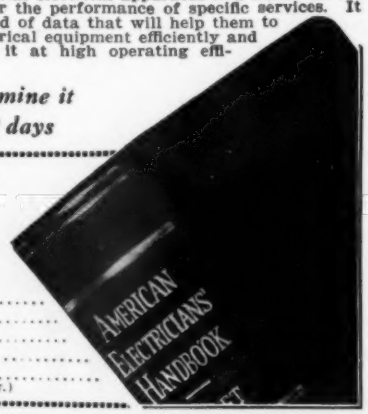
Terrell Croft's

American Electrician's Handbook

1018 pages of direct helps showing you how to handle every type of practical electrical job, $4.00.

CROFT'S American Electricians' Handbook has become world-famous. Nearly a hundred thousand practical electrical workers know and respect this great pocketbook of practical electricity. It presents the kind of information that helps practical electrical men —wiremen, contractors, linemen, plant superintendents, operators and construction engineers—to select and install commercial electrical apparatus and materials intelligently for the performance of specific services. It gives the kind of data that will help them to operate electrical equipment efficiently and to maintain it at high operating efficiency.

Examine it 10 days



SEND THIS ON-APPROVAL COUPON

McGRAW-HILL BOOK CO., INC.
330 W. 42d St., New York City

Send me Croft's American Electricians' Handbook, 4th Edition, for 10 days' examination on approval. In 10 days I will send $4.00, plus few cents postage, or return book postpaid. (We pay postage on orders accompanied by remittance.)

Name .....
Address .....
City and State .....
Position .....
Company .....
EC-8-36 (Books sent on approval in U. S. and Canada only.)

vising them that observance of these principles is important for their own protection as well as for the maintaining of fair competition, and

BE IT FURTHER RESOLVED, That copies of this resolution be sent to National Electrical Manufacturers Association, Rigid Steel Conduit Association and National Electrical Wholesalers Association and that they be advised that it is the obligation of the manufacturer and his agent to see to it that all contractors maintain this policy.

Separation of Contracts Committee Withdrawn

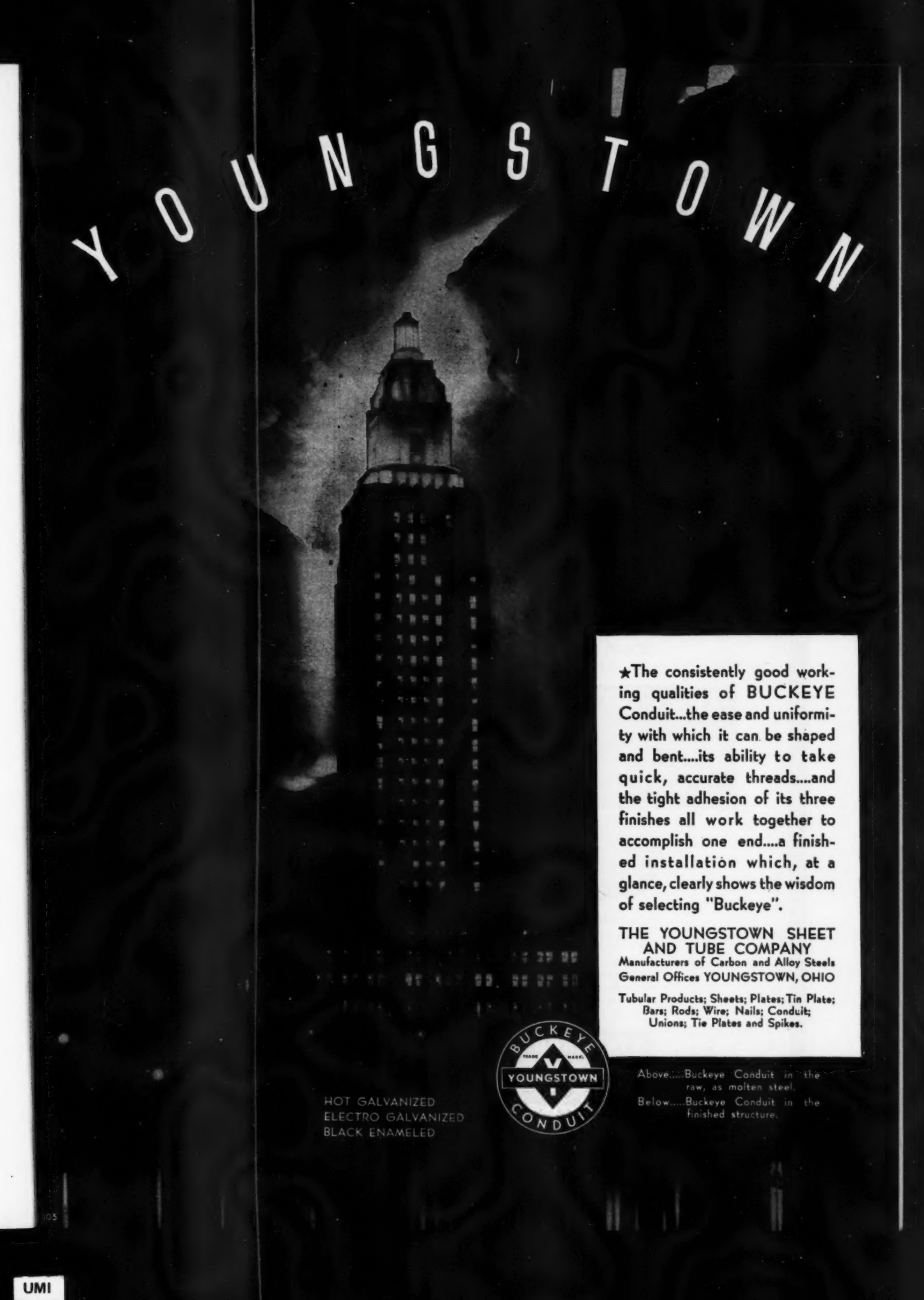
As the result of an exhaustive analysis by the committee and the apparent impossibility of making any immediate progress in obtaining legislation in congress for the separation of contracts for the three respective branches of mechanical equipment on federal buildings, the Joint Committee on Separation of Contracts formed in 1931 and which has represented the National Electrical Contractors Association, the Heating, Piping and Air Conditioning Contractors National Association, and the National Association of Master Plumbers, have requested that they be discharged from their duties by the member associations and that the project be held in suspense until a new committee be formed when conditions may warrant.

In 1932 through the efforts of the joint committee bills were introduced in the House and Senate, and hearings held, but these efforts, together with later work by the joint committee, failed to obtain favorable consideration for such legislation.

Revision of Standard Symbols

The N.E.C.A. has appointed G. M. Sanborn of Indianapolis as their representative on a newly organized sectional committee of the American Standards Association on Standardization of Graphical Symbols and Abbreviations for Use on Drawings (Project Z32). The work of the American Standards Association on symbols and abbreviations, has recently been reorganized and placed in the hands of two committees. One of these committees covers letter symbols and abbreviations for use in publications, and the second committee covers graphical symbols of all types and abbreviations for use on drawings.

It is proposed to consolidate with this general program the former project covering symbols for the electrical equipment of buildings, which since 1922 has been under the joint sponsorship of the N.E.C.A., A.I.E.E. and A.I.A. The sponsors have believed for some time that the symbols for electrical equipment of buildings are particularly



★The consistently good working qualities of BUCKEYE Conduit...the ease and uniformity with which it can be shaped and bent....its ability to take quick, accurate threads....and the tight adhesion of its three finishes all work together to accomplish one end....a finished installation which, at a glance, clearly shows the wisdom of selecting "Buckeye".

THE YOUNGSTOWN SHEET AND TUBE COMPANY
Manufacturers of Carbon and Alloy Steels
General Offices YOUNGSTOWN, OHIO

Tubular Products; Sheets; Plates; Tin Plate; Bars; Rods; Wire; Nails; Conduit; Unions; Tie Plates and Spikes.

BUCKEYE TRADE MARK YOUNGSTOWN CONDUIT

HOT GALVANIZED
ELECTRO GALVANIZED
BLACK ENAMELED

Above.....Buckeye Conduit in the raw, as molten steel.
Below.....Buckeye Conduit in the finished structure.

UMI

Franklin K. Lane
High School, N. Y. City

WIRE

Arc Electrical Construction Co., Inc., Contractors

Armored Cable
Armored Service Entrance Cable
Annunicator Wire and Cable
Bare Copper Wire and Cable
Control Cables, Braided and Lead
Fixturoof Wire and Cable
Flexible Cords and Cables
Flexible Steel Conduit
Lead-covered Wires and Cables
Magnet Wire
Non-metallic Sheathed Cable
Non-metallic Parkway Cable
Parkway Cables
Power Cable
Rubber Insulated Wire and Cable
Rubber Sheathed Portable Cords
Signal Cables
Varnished Cambric Cables
Weatherproof Wire
Special Wire and Cable to meet all Specifications

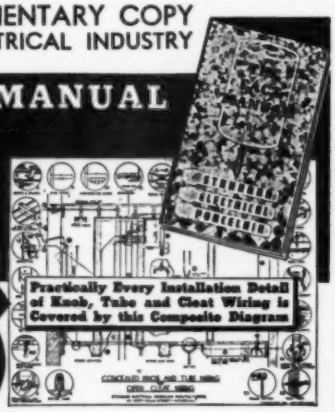
No wiring installation is more important than that done in schools. The safety of many precious lives is at stake. The above is an example of the modern type of school building in which Crescent Wire is installed.

CRESCENT
INSULATED WIRE & CABLE CO. INC
TRENTON, NEW JERSEY

A COMPLIMENTARY COPY
for EVERYONE in the ELECTRICAL INDUSTRY

THE FACT MANUAL

The First Manual of its kind ever published on the Knob and Tube Wiring System



NEVER BEFORE AN INSTALLATION DIAGRAM LIKE THIS!

Another Important Aid to Proper
ELECTRICAL SPECIFICATION

In addition to the Diagram of Installation Detail's, the FACT MANUAL contains 16 pages of information of vital importance on the proper installation and selling of this economical and permanent wiring method. Mail coupon or write Dept. D today for complimentary copy.

RUSH me complimentary copy of Fact Manual
☐ Contractor ☐ Electrician ☐ Utility Official
Name.....
Street.....
City..... State.....
Dept. D

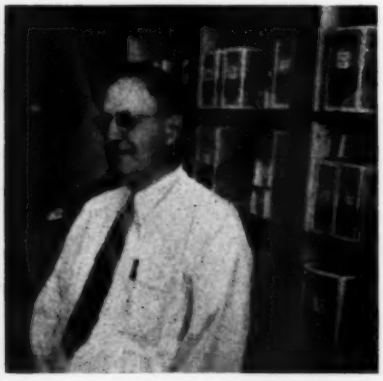
STANDARD ELECTRICAL
PORCELAIN
MANUFACTURERS
201 N. WELLS ST., CHICAGO, ILLINOIS

out of date and should be revised. It is proposed that such revision of the symbols for the electrical equipment of buildings will be handled by a sub-committee which will be substantially the same as the former sectional committee for the project, and the list of symbols will keep its identity as a separate publication.

Mr. Sanborn, who will represent N.E.C.A. on this new committee, received the James H. McGraw Award in 1933 for conceiving and developing through the original committee the standard symbols for wiring plans which were established as national standards in 1924.

Identification of Piping Systems

The N.E.C.A. has been requested by the American Standards Association to appoint representatives to a sectional committee on the Identification of Piping Systems. The purpose of this project is to harmonize all specifications for the identification of materials conveyed in piping systems. The present need is for a clear, concise scheme which will quickly establish in the minds of plant employees and others working among piping systems and conduits, the danger or safety of materials carried in a given pipe. It is hoped by the use of an effective scheme to permit of the complete identification of the materials in the piping systems with which workmen must come in contact. A workman in approaching a piping system will thereby be warned and protected against the danger of breaking into a pipe carrying materials hazardous to life or property.



HEADS KANSAS CONTRACTORS: With the nation's attention focussed on the Sunflower state, John W. Jenner, president of the Kansas Electrical Contractors' Association is out stumping, for a non-political cause, but for his own industry. Mr. Jenner recently purchased the Shelley Electrical Co. of Wichita, Kans., and immediately began rounding up contractors at meetings that were held in neighboring communities. He is hopeful of getting a strong state-wide membership which can be sufficiently representative of the industry to bring about improvements in state legislation, also a better cooperative condition within that state's industry groups.

The Manufacturer's Guide to More Effective Distribution

DURABLY BOUND IN A STIFF LEATHERETTE COVER

SIZE 6x9⅛ INCHES HANDY FOR READY REFERENCE

1936 EDITION

"VERIFIED" DIRECTORY OF ELECTRICAL WHOLESALERS

Completely revised, with many new listings

The 1936 Edition includes all desired information (except credit rating) for

1080 "VERIFIED" ELECTRICAL WHOLESALERS

Each listing includes

- Name and address of firm.
- Branch and affiliated houses.
- Names of officers and department managers.
- Name of purchasing agent.
- Territory covered.
- Number of salesmen — city, country, counter.
- Floor space occupied.
- Regular Inventory.
- Lines handled — supplies, appliances, radio, fixtures.
- Year business was established.
- Memberships in national and local wholesaler associations.

All at a cost of less than 1½c per listing.
Single Copies, $15.00—Additional Copies, $7.50.

Save time and money through "verified" distribution

ELECTRICAL WHOLESALING • 330 W. 42nd ST., NEW YORK, N. Y.

UMI

Contracting . . . . News . . . . . .

Wisconsin Law Lacks Enforcement Teeth

Through the lack of proper enforcement laws the effect of the Wisconsin Electrical Code is largely lost in the territory outside of cities with inspection departments. The attorney-general has ruled against county inspectors as not being provided for in the law. Likewise he has ruled against inspectors acting under the authority of the Industrial Commission but paid for by the insurance interests.

To correct these deficiencies in the present law, the Wisconsin Electrical Association will try at the next session of the legislature to have a bill passed that will provide for state wide inspection.

Until that is brought about the mutual insurance interests will try to place a sufficient number of men in the field to inspect rural wiring. These men are to be supported by a small fee to be paid either by the contractor or the owner.

Railroad Crossing Signal Work Suit

The electrical contractors have taken their fight to get the railroad crossing traffic signal work that is a part of the federal unemployment relief program into court. The A. A. Electric Company of Chicago has brought suit in the Cook County (Ill.) Circuit Court against four state officials asking that they be enjoined from letting such work to the railroads, or from buying certain flashlight signals without an alternate in the specifications.

The case has been referred to a master of chancery who will hear evidence.

The complaint alleges that insufficient time was allowed between the asking for bids and the closing dates to permit bidders to visit all the locations for signals, that the plaintiff did bid on certain projects and was the only bidder, that his bid was rejected unlawfully, and that subsequently the work was awarded to the railroads without requiring them to comply with the WPA contractor regulations.

As many millions of dollars worth of electrical work is involved throughout the country, the industry is watching this case for its possible effect upon similar work in other states. Walter J. Collins, secretary of the Electrical Contractors Association of Chicago, is heading up the N.E.C.A. committee on this matter.

Red Flame House for Eastern Inspectors

Every branch of the metropolitan electrical industry is working on plans for the annual meeting of the Eastern Section, International Association of Electrical Inspectors to be held in the Hotel New Yorker, September 8, 9 and 10.

The Red Flame House, which was so popular at some of the earlier conventions of the Eastern Section, will be shown again this year with bigger and better violations. Entertainment features of a wide variety are being planned for everybody.

REA Reduces Number of Farms for One Wiring Contract

Some changes with respect to policy in the administration of the rural electrification program are taking place which should have considerable bearing upon the relation of electrical contractors to this class of work.

Of the $100,000,000 that was originally allocated to rural electrification, $90,000,000 was taken back by the president for other purposes. Within the last few weeks, however, REA has become a permanent institution with an annual grant for ten years totalling $410,000,000 altogether. None of this money is emergency money or carries any of the unemployment relief feature.

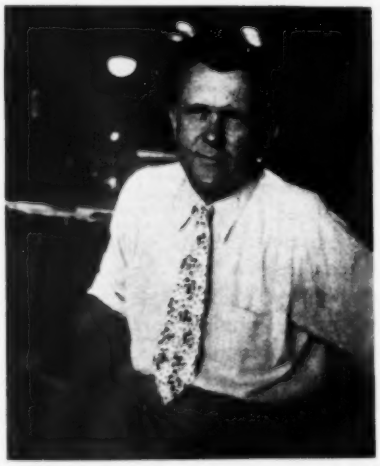
Whereas the emergency measure was for the purpose of financing line construction, the money now available may be used also to finance the farmstead wiring.

It was the announced policy of REA when first considering the financing of farmstead wiring to require that bids be taken for large groups of farms on the theory that contracts for the wiring of one hunded or more farms would result in substantially lower prices. Administrator Cooke, however, is now of the opinion that such large bulking of farm wiring jobs under a single contract might not be as beneficial, at least at the present time, as substantially smaller contracts. As a result the Administration is reducing the number of farms necessary for a bulk contract from fifty or more to ten.

The Administration has taken cognizance of the fact that the best farm wiring will probably come from contractors who are thoroughly familiar with farm needs. These men as a rule operate in the smaller and rural communities and for that reason do not have large crews of electricians. At the same time they do not have large stocks of tools. To require these men to contract for fifty to one hundred farms at one time would mean the necessity for employment of crews of unknown quality and background. In addition to the possibility of poor work, there would be the possibility of theft of farm products.

The Administration places no contracts for farmstead wiring. It loans the money direct to the cooperative, which in turn must let the contracts. The Administration, however, feels that it has a certain investment in the wired farmsteads, and for that reason desires to see the work done only by competent contractors. Therefore, it is highly improbable that the minimum number of farms for a contract will go below ten. To materially lessen the number would open the bidding to a vast horde of unreliable contractors.

The money available for financing wiring may under the law be loaned to contractors. These contractors, however, must be incorporated. In practice



OPERATES BONUS PLAN: One of the large operators in Texas on public and commercial projects, Mark Wright of Wright Brothers, San Antonio, believes in the bonus system for his foremen. When a job is begun the layout is gone over carefully and the labor is checked over with the man to run the job. The foreman is charged with full responsibility to make whatever changes he may encounter that will reduce the labor cost, this saving being shared at the finish. Mr. Wright looks forward to good business in the southwest. At present his company has an $85,000 local post office contract, similar jobs in Austin and Waco, also some large work at the State University in Austin.

FLUSH RECEPTACLES

CLOCK HANGER OUTLET — upper left: Provides mechanical support for the clock, with electrical connection concealed. Gets rid of unsightly cord running from clock to nearest receptacle. Receptacle part is recessed; plug is sunk flush with wall so clock hangs flat over outlet.

FLOOR OUTLET — lower left: For plugging in lamps and appliances without nuisance of cords to wall. Deeply recessed, so plug is sunk flush with floor. Has two screw covers; one with cord hole, the other closed. Designed primarily for use in hardwood floors; not waterproof.

OUTDOOR RECEPTACLE — upper right: Provides permanent place to plug in outdoor lighting connections or appliances. Completely weatherproof; cadmium finish on brass. Has rubber mat fitted under plate. When not in use, metal cap screws over receptacle opening for further protection.

RADIO OUTLET — lower right: Provides aerial, ground and power connections from a one-gang outlet. Takes a standard wall box and standard Bakelite plate. Receptacle is all Bakelite, with aerial, ground and power connections plainly marked. Positively fool-proof in use.

HART & HEGEMAN DIVISION
THE ARROW-HART & HEGEMAN ELECTRIC CO. HARTFORD. CONN.

UMI

AIR CONDITIONING SPECIALIST: When commercial air conditioning became practical, Zennie Hirsch of the Oklahoma Electrical Supply Co., Oklahoma City, began a separate department for this business which now has twenty-two completed installations to its credit. Mr. Hirsch has been in business at Oklahoma City for twenty-seven years and has built up a large contracting and store organization. Specially trained department heads operate the ventilation, commercial lighting, lamp sales and contracting departments. One of the newest and largest local hotels was engineered and wired by this company on a time-and-material contract which amounted to over $150,000. The store and lighting equipment display rooms are among the finest in the southwest.

it is quite probable that none of this money will ever reach the contractors as direct loans because the amounts would be too small to warrant the setting up of the official machinery of the Treasury Department.

The money loaned for farm wiring will cover the wiring of the farmstead only. It will not cover the purchase of appliances or lighting fixtures.

In order to place the bidding of the contractor upon a fair competitive basis, farmstead wiring has been broken up into what is known as contracting units. This refers to such units as would generally be used in good estimating practice. The representative of the cooperative will then contact the farmers who are to receive service and draw up for each a tentative list of contracting units. These lists will be furnished to competing bidders.

As will be noticed from the above, the quantities will be arrived at by the representative of the cooperative after consulting with the farmers. The Administration has no standard of wiring adequacy to follow. It will adhere to the National Electric Code for safety standards.

The matter of inspection of the farm wiring has not yet been worked out. Where the properties lie within areas covered by local inspection, there will be no problem. In other districts there will be close cooperation with the mutuals and such other organizations as are placing insurance.

While REA has taken the National Electrical Code as the standard for installation practice, Administrator Cooke holds that there is no necessity for going as far in wiring regulations on a farm as local city ordinances have gone. He also feels that farm wiring, although it introduces a new hazard, does materially reduce the fire hazard on a farm due to open flame.

So far as adequacy is concerned it will be the policy of the Administration to suggest that farms have enough wiring not only to take care of the equipment which they intend then to use, but to provide ample surplus capacity. REA, however, has adopted no standard of adequacy.

Power Company Provides Re-Wiring Literature

Modern home wiring folders were recently prepared and mailed to 32,000 users of electricity by the Kansas Gas & Electric Company of Wichita, Kans. Nineteen local electrical contractors whose names appeared alphabetically on these folders paid for the postage, and were invited to solicit work on the payment plan, with the payments assignable to the customer's electric service bill.

The folders were made of two letter size pages, printed in three colors and bore eight timely illustrated suggestions for added electrical convenience in the home, namely closet lighting, outside lights and switch control, workshop lighting, backyard lighting, bath room mirror lights, garage lighting, and multi-location controls.

New Denver Association

A new organization of electrical contractors has been formed in Denver, Colo., known as the Associated Electrical Contractors. The president is Earl C. Gould and Fred Fisher is secretary.

Revive Convention at Sea

The convention at sea, once an annual custom of the Southern California Chapter, N.E.C.A., this year was successfully revived with an overnight voyage from Los Angeles to San Diego.

Progress and plans in relation to putting President Peak's industry promotion program into effect were outlined by Frank Watkins, director of purchases for the Southern California Edison Company. He urged contractors to follow the lead of the utilities in rate cutting by adopting methods which would lower the cost of wiring, thus increasing the field of electrical use, ultimately increasing the volume of the contractor's business. He extended unqualified assurance of the utilities' support to contractors abiding by the N.E.C.A. pledge.

Among other speakers were Ross Hartley for the range committee of the Electrical Development League; John Duncan, Westinghouse Supply Company, who assured wholesalers' support of the cooperative program; Henry Rice, Southern California Edison Company, and Joe Rose of the Bureau of Power and Light.

J. O. Casey, Quality Electric Company, Ltd., Los Angeles, was elected president; L. W. Wetzel, Kuster Wetzel Company, Long Beach, vice-president; and Fred Ulbrick, Ul-Hart Electric Company, Los Angeles, secretary-treasurer.

Elected to the executive committee were G. E. Arbogast, Newbery Electric Corporation; C. W. Jones, Valley Electric Company; H. L. Evans, Nicholas Electric Company, and J. E. Chandler, Chandler Electric Company.

HANDICAPPED BY INJUNCTION: C. E. Converse, city electrician of San Antonio, Tex., for the past 24 years, carries on with a force of three deputy inspectors under an ordinance which has had the licensing and bonding features made inoperative by an injunction. Since November, 1934, when a group of contractors obtained an injunction, there has been no authority to enforce contractor licensing. As a result any person may secure a permit for electrical construction work without being required to qualify by an examination, and without posting a $5,000 bond, as was formerly required by ordinance. Because of this "wide-open" condition in San Antonio there is more detailed inspection work required to ascertain the quality of installations made in that city, Because of the injunction, no one is required to maintain a place of business and therefor a large number of persons who do small electrical work are difficult to locate when their installations are found to be incomplete.

Cooperate to Sell Adequate Wiring

That cooperative effort of contractors, builders and utility men will result in the sale of adequate wiring for homes has been proved by the Southern California Edison Company. On their lines, 167 Red Seal certificates were issued to new homes in three months, and 100 Red Seal jobs are pending as the result of activities of their "Electric Home Planning Specialists."

These are nine men on the company's sales staff who cooperate with contractors, engineers, architects and dealers in selling wiring adequacy to the new home builder. It is estimated that each home planning specialist makes in the neighborhood of 500 contacts per year and that every wiring job is improved whether the finished home meets Red Seal specifications or not. In one new subdivision, where twenty-two homes were being constructed, thirteen were all-electric and several included air conditioning as well.

Each salesman is equipped with a visualizer portfolio containing photographs and plans for homes costing from $4,000 to $100,000 together with complete operating costs for typical homes, showing actual bills taken from the company's books.

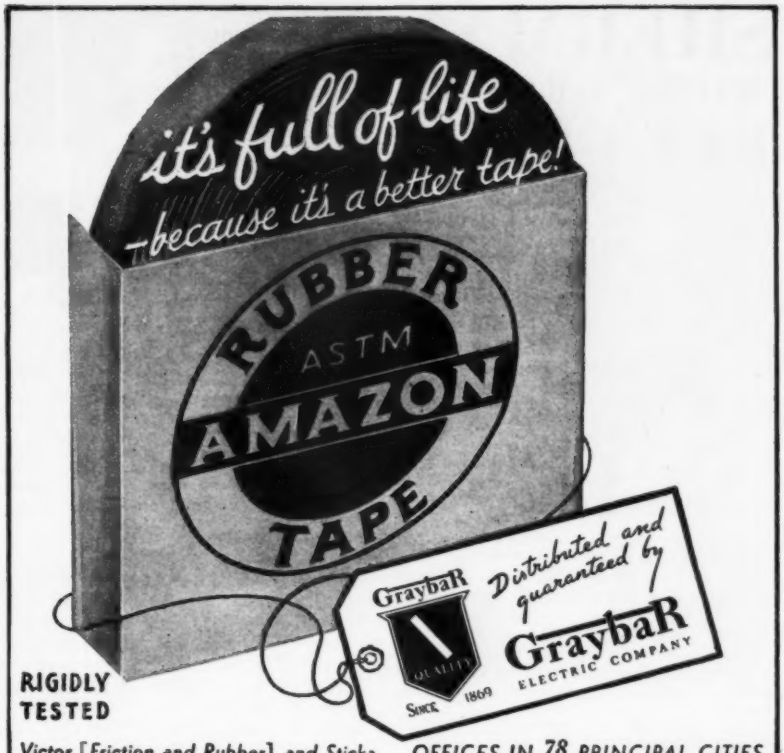
Minnesota Summer Meeting

The annual summer meeting of the Minnesota Electrical Association and the Minnesota Electrical Council was held at Breezy Point, July 12 and 13. The sessions were devoted to discussions of rural electrification, merchandising trends and construction recovery.

Changes in Electrical Committee Representatives

As the result of the resignation of Earl N. Peak from the Electrical Committee, N.F.P.A., because of his heavy duties as president of the National Association, the N.E.C.A. has appointed his

COMPLETES LARGE TEMPORARY JOB: The opening of the Fort Worth, Tex., Frontier Centennial marked the completion of several months' rush work for E. A. Shotts, Jr., of Shotts Electric Co. A peak crew of forty-four men was employed at this job. Mr. Shotts carries on a business that is regarded to be one of the oldest in Texas under original management. E. A. Shotts, who founded the business in 1906, is still actively engaged.



RIGIDLY TESTED

Victor [Friction and Rubber] and Sticka Tapes also Distributed and Guaranteed by GRAYBAR.

OFFICES IN 78 PRINCIPAL CITIES. EXECUTIVE OFFICES. GRAYBAR BLDG., NEW YORK N Y

A Best Seller!

1936 EDITION

"VERIFIED" DIRECTORY

of

ELECTRICAL WHOLESALERS

Completely revised, with many new listings

PLACE YOUR ORDER NOW

Single Copies, $15.00. Additional Copies, $7.50 each.

ELECTRICAL WHOLESALING

330 WEST 42nd STREET NEW YORK, N. Y.

UMI

SHERMAN
RIGID GROUND
FITTINGS

Approved

The SHERMAN Rigid Ground Fittings are made to give you perfect conductivity, ease of installation and great flexibility—Can be used with flexible wire, bare wire or rigid conduit. Made for both soldered or solderless installations.

GF4.

GF4

This Fitting is designed for bare or insulated wire handling sizes in range from No. 4 stranded to No. 8 wire. The No. 4 wire need not be bent in assembly as snubbing action of indented groove in assembly assures a tight contact. Bosses on sides of bolt slots for clamping pipe prevent lock washer from slipping out while assembling. Has slotted pipe clamp jaws which are reversible for use with ground rod. Sherman makes a complete line of 6 rigid ground fittings to fill any requirement.

Sold Thru Jobbers

H. B. SHERMAN MFG. CO.
BATTLE CREEK, MICHIGAN

PICKING UP: Eugene Ashe of Ft. Worth, Tex., is busy again in a big way with jobs totalling about $250,000 under contract in several Texas cities. The Eugene Ashe Electric Co. has large contracts at Houston, Austin, Ft. Worth, and smaller jobs in other localities.

alternate, George Andrae of Milwaukee, Wis., to serve as representative, and W. L. Fowler of Cedar Rapids, Iowa, to serve as Mr. Andrae's alternate. The N.E.C.A. is also represented on the Electrical Committee, N.E.P.A., by Allan Coggeshall, New York, with Theo. H. Joseph, New York, as his alternate.

I. E. S. Convention in Buffalo

The thirtieth annual convention of the Illuminating Engineering Society will meet at the Hotel Statler, Buffalo, N. Y., August 31 to September 3.

The new mercury vapor light sources will be dealt with in several papers. Modern lighting, particularly in relation to architecture, will be discussed by several authorities.

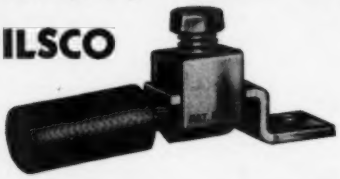
Exhibits of leading manufacturers of lighting equipment will show the latest development in light sources, lighting equipment and lighting practices.

Elbert L. Overton

Elbert Le Roy Overton, a pioneer electrical contractor of Topeka, Kan., died May 20, at the age of 69. As the proprietor of the E. L. Overton Electric Company, Mr. Overton became widely acquainted throughout Kansas, having been in business at Topeka for nearly 50 years. He installed some of the first power transmission lines in nearby towns, also Topeka's first "White Way." The company will continue in business under the management of Mrs. Adair F. Overton, who has been active in the business since her marriage to Mr. Overton 27 years ago.

SIMPLE, ISN'T IT?

ILSCO



SOLDERLESS CONNECTOR

NOTICE: The ***triangular wedge*** formed by the tang and V-bottom collar, which forces the wire into a ***solid mesh***—

NO set-screw contact . . .
NO flattening or separating of wires . . .
NO limitation to one size wire . .
NO shearing effect whatsoever . .
NO special tools required to make connection . . .

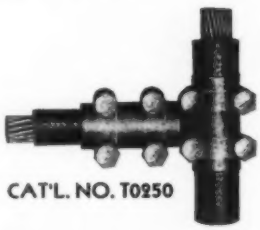
NO need for you to search any longer for the PERFECT Solderless Connector—WE HAVE IT!

Ilsco solder lugs show the size of the largest wire they will take.

FREE—A large display board, containing mounted samples of ILSCO lugs. Sent upon request.

ILSCO COPPER TUBE & PRODUCTS, INC.
5629 Madison Road, Cincinnati, Ohio

CAT'L. NO. 1021



CAT'L. NO. T0250

CAT'L. NO. 400T

Write for our new COMPLETE CATALOG OF SOLDERLESS TERMINAL LUGS & CONNECTORS.

KRUEGER & HUDEPOHL
232-8 Vine Street, Cincinnati, Ohio

MINERALLAC

Cable or Conduit Hanger

Jiffy Clip

Now furnished in EVERDUR as well as Cadmium Plated Steel.

Cable or Conduit Hanger
Rigid Conduit—⅜"—2½"
Thin Wall—½"—1½"

Jiffy Clip
Rigid Conduit ⅛"—1¼"
E. M. T. (Thin Wall) ½" & ¾"
Also BX Cable

Ask your Jobber

MINERALLAC ELECTRIC CO.
25 No. Peoria Street, Chicago, Ill.

New York City Branch
381 Fourth Avenue

A Roll o' Tape

Field notes about men of the contracting shop, and inspection branches of the industry

LARGE feeders are unreeled, cut to length and tagged in the Geo. La Vigne Co. shop, Miami, Fla., for rush jobs that do not permit exact lengths being ordered on factory reels. This method of handling avoids possible damages to insulation where cables must be unreeled and dragged around in buildings under construction.

BELIEVING that window shoppers soon know what's new in your display, F. A. Menger, Menger Electric Co., San Antonio, Tex., sees to it that the front rows of lighting fixtures are changed regularly.

WHILE re-wiring an old opera house in Fort Worth, Tex., J. T. Massey of the Paramount Electric Co., found soapstone in conduits that had evidently been used while pulling wire 28 years ago. The old wires were easily removed, and the enamel on the inside walls of the conduits seemed almost like new. As a result many lengths of old conduit could be used again for the revamped layouts.

IT isn't only electrical contractors that have their troubles with wild bidders, reports R. E. Medford of the Central Electric Co., Fort Worth, Tex. A recent bid to re-wind six special 3-kw. armatures varied from $176 to $725 for the job. Medford had previously done one of these jobs at a net cost of $41.

HOW inspectors and contractors can cooperate to clean up old wiring is revealed at Houston, Tex., where a furniture store is remodelling its front. The J. J. Hill Electric Co. has the new window job to complete, but before this new work is approved, the balance of the building will be repaired to a safe condition. That arrangement was made when the contractor called in F. A. Goodson, chief electrical inspector, for a preliminary check-up.

THE Jones Electric Co. at Topeka, Kan., which does around $1200 per month in V-belts and pulleys, plus general service shop work and wiring, is building a new shop to have about 5400 sq. ft. of floor area.

A GROUP of panelboards which serve the 50-ft. by 200-ft. first floor of a new Fort Worth, Tex., chain store control two hundred eighty-two No. 10 branch circuits. This adequate wiring job is being installed by the General Engineering Corp., a local organization which also engages in several other mechanical trades.

LARGE operations go at close margins, which makes it imperative for the wide-awake contractor to keep good cost records of all past work. The Eugene Ashe Electric Co., Fort Worth, Tex., has kept its records from all past work as an accurate check against similar work that is being quoted.

THOSE who think lightly of code discussions regarding outlet boxes would have found this subject quite interesting when E. H. Rueppel of the State Inspection Bureau appeared before a recent meeting of the Electrical Clearing House of Louisville. Ky. Mr. Rueppel had several standard types of approved outlet boxes with him, and conducted an open forum interpretation of section 512-a of the N.E.C.

PERHAPS many contractors become too deeply engrossed in every-day routine to analyze what kind of work they are best able to do. Chas. A. Soper of Brooklyn, N. Y., likes fire alarm work, has made it his business to know it well, and therefore gets this type of business, while others are still on the search for work.

EMPLOYEES of the Jones Electric Co., Topeka, Kan., wear uniformed shirts bearing the company's name on the back.

COOPERATION in selling or suggesting adequacy provisions will often bring one of the bidders a larger job states R. M. Sutton, Southwestern Electrical Co., Wichita, Kan. When only one contractor makes suggestions the chances are not so favorable. Mr. Sutton cites a large apartment house for which he tried to make provisions

10,000 volts
X2
20,000 volts

A double
SAFETY FACTOR
..at no extra cost!

• There is so much new live rubber used in DUTCH BRAND Rubber Tape that one thickness will resist 20,000 volts...twice as much as ordinary rubber tape!

But that's not all...

Here is a tape that actually replaces the original insulation. One layer fuses and welds itself to the other, forming one solid piece...and it's rugged enough to last for years.

If you want something better in Rubber Tape, demand DUTCH BRAND of your jobber.

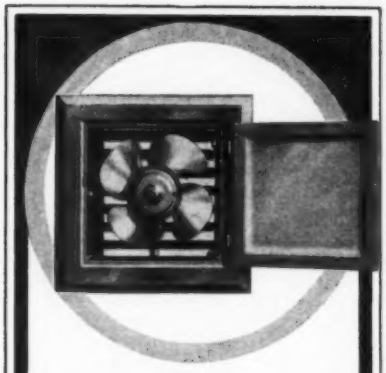
DUTCH BRAND *Friction Tape, Rubber Tape and Soldering Paste are sold by electrical jobbers everywhere.*

VAN CLEEF BROS. Estab. 1910
Manufacturers
Woodlawn Avenue, 77th to 78th Streets
Chicago, U. S. A.

The Jumbo Package
Contains 10 standard No. 8 rolls, the economical way for repairmen, electrical contractors and industrial users to purchase Friction Tape where individually cartoned tape is not required.

Standard Packages
The Nos. 8, 4, 2 and 1 sizes of Friction Tape are all available in the well known orange and blue individual and display cartons and metal counter dispensers for retail sale.

DUTCH BRAND
Friction Tape



Automatic Wall Box Kitchen Ventilator Fan

Built-in type for permanent installation, it is telescopic in design, adjustable to wall thickness 7" to 13". No wood or metal frame or screws in the plaster, wood, or brick necessary. Inside and outside polished cast aluminum; wall box rust resisting steel. Quickly installed in old or new homes. Automatic switch and shutters controlled by opening and closing of the door. 10" silent blade fan; available for A.C. or D.C.; A.C. non-radio interfering. Write for bulletin and prices.

SIGNAL ELECTRIC MFG. CO.

Menominee, Michigan, U. S. A.

OFFICES IN PRINCIPAL CITIES

SIGNAL

NO FIRE HAZARD

Before... During... After Application

IDEAL

SOLDERLESS— TAPELESS WIRE CONNECTORS

Do away with the open flame required for solder-and-tape joints. No blower or burner to smudge walls, ceilings and insulations—to make hot work hotter—to get in the way and possibly be overturned. No danger of a "short" when wire ends are tightly gripped in this hard, tough holder that they cannot pierce. These IDEAL joints are better electrically and stronger mechanically. Reduce wiring costs.

IDEAL "THREAD-ON" LUGS thread on in a jiffy. Fully approved. Listed by Underwriters' Laboratories.

Bulletin and Samples on Request

Ideal Commutator Dresser Co.

1041 Park Ave., Sycamore, Illinois

for electric ranges, if only empty raceways from the shaft to each kitchen. Being alone in his effort the idea was discarded. Recently the owners were very anxious for someone to devise a way to install range wiring without marring the occupied structure.

TO McEldowney & Son, Oklahoma City, Okla., goes the distinction of the first extensive bus bar riser system in that locality. This company's $65,000 courthouse wiring contract includes a 4,000 amp. riser enclosed in sheet aluminum.

AFTER pioneering in electrical work in England, then at Mexico City, H. S. Foster opened a modest 12 by 12 motor shop at San Antonio, Tex. In nine years the San Antonio Armature Works has twice outgrown its space, and today is quartered in a 9,000-sq. ft. building. "It pays to maintain a reputation for quality work," says Mr. Foster.

A PROBLEM yet to solve says P. W. Agrelius of the Shelley Electric Co., Wichita, Kan., is the preservation of lead covered underground conductors that must be run out of doors above the frost line. It seems that enough moisture gets back under the lead sheath which, when frozen, expands and bursts the sheath within the run of raceway. This condition is particularly noticeable in gasoline service stations.

A LARGE residence is being wired by the Martin Wright Electric Co., of San Antonio, Tex., in which the lights in each principal room may be dimmed to any desired intensity, according to Truex Rennebergy.

A CONTRACTING business established in 1889 at Brooklyn, N. Y., by J. O. Forker is known today as J. O. Forker Sons. The founder's five sons are all actively engaged in the firm under the direction of Thomas S. Forker, a hard worker in that city's electrical affairs. Wiring finished buildings, such as additions to apartment house systems, and the installation of church chime systems are specialties.

THE contractor store layout that includes a lighting fixture display should be kept down to a minimum area, in the opinion of T. C. Telotte, Telotte Electric Co., San Antonio, Tex. Mr. Telotte's new office and display room is arranged that way, and saves running a customer all over the place to show a suggested lot of fixtures. Dont wear them out before you've made made a sale, is Mr. Telotte's view of the matter.

For

Residence Wiring

The Best and Safest Method is a properly installed KNOB and TUBE job. Be sure and get the

TRADE Bull Dog MARK REGISTERED

Assembled Knob because it "HAS A GRIP LIKE ITS NAMESAKE."

ILLINOIS ELECTRIC PORCELAIN CO.

MACOMB, ILLINOIS

THE

Badger

50 AMPERE

Synchronous

TIME SWITCH

. . . dependable

. . . at low cost

Here is a time switch that you can depend upon to give absolutely satisfactory service.

Sell quality and eliminate costly service calls.

See your wholesaler or write for complete descriptive literature.

RELIANCE AUTOMATIC LIGHTING CO.

1937 Mead Street Racine, Wis.

New Products . . for August . . . .

Range and Lighting Panel

A combination dead front panelboard, Bulletin 4334H15, which includes main and range circuit fuse and switch connections of the pull-out type, also four plug

fuse connections for other branch circuits. The two pull-out devices are non-interchangeable to provide for maximum safety. The entire assembly is removable from the cabinet by loosening one screw. Holes are provided in the blocks to permit making tests without removing fuses. Solderless terminals are provided, also porcelain barriers around all terminals. Cutler-Hammer, Inc., Milwaukee, Wis.

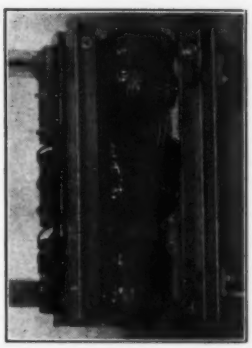
Combination Outlet

A porcelain, pull-chain octagonal-base outlet box receptacle in which is combined a standard convenience outlet.

Recommended for attic, cellar, garage or workbench outlets, it is made in the No. 1620, 3½-in. box; and in the No. 1624, 4-in. box types. John I. Paulding, Inc., New Bedford, Mass.

Air Cooled Transformer

A line of 3-phase, 60-cycle transformers of semi-portable design which are recommended for use by small companies or equipment demonstrators to operate their motors on different voltages as may be encountered in moving from one place to another. They are air-cooled, ranging from 1 to 50 k.v.a., and have terminals for 220, 440 and 550 volts. These connections are said to permit changing from 220 to 440 and 550 V.,



from 440 to 220 and 550 V., or from 550 to 220 and 440 V., without any alteration in the transformer being necessary. Similar transformers may be had for 2-ph., and for other voltages. The units are attached to steel angles and covered by a ventilated steel case that encloses all live parts. Forbes & Myers, Worcester, Mass.

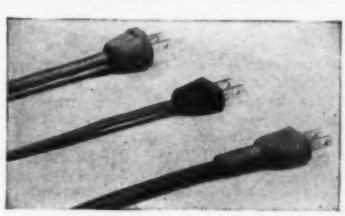
Electric Drill

The "Victor" No. 114 electric drill is designed for service job use by electricians and other trades. It has a capacity up to ¼-in. in steel, and has a uni-

versal type motor which operates at a load speed of 1,500 r.p.m. Weighing only 5¼ lbs., and measuring 12½ in. long, it may be carried in a workman's kit. It has a heavy duty three-jaw chuck and a one-piece aluminum alloy casting which comprises the motor frame and handle. The Stanley Works, New Britain, Conn.

Soft Rubber Plugs

The "U S." line of rubber plugs comprises three models for use with several types of appliance or lamp cord. No. 1, (upper left) is oval in shape, No. 2 is a small flat unit, and No. 3, (right) has a special finger grip to facilitate connect-



ing and disconnecting. All types are termed unbreakable. They are furnished as integral parts of cords, with all connections soldered. United States Rubber Products, Inc., (Wire Division), New York, N. Y.

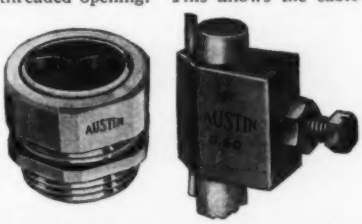
D.C. Photoelectric Relay

A line of d.c. photoelectric relays for operation on 115 and 230 volts. These units are available with 2-in., and 3-in. lens apertures; with rectangular cell apertures and no lenses; and with no

apertures; the latter being for use with separate cell housings. The No. 5353-C unit illustrated is housed in a heavy formed steel cabinet for industrial control and commercial applications. A necessary resistor unit is mounted on the side as shown. G-M Laboratories, Inc., Chicago, Ill.

Service Fittings

Two watertight connectors for use with service entrance cable. The No. RT-228 hex-nut connector has a 2-hole rubber bushing which becomes compressed around the cable when the hex-nut is tightened. It will accommodate two runs of 2-conductor No. 8 bare neutral service cable, and fits a 1-in. knockout or threaded opening. This allows the cable

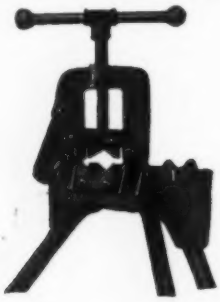


to be brought down into an outdoor meter fitting and the meter cable section or feeder to be then carried upward into the building. The No. SO-36 two-screw connector has either an oval or round-hole rubber bushing which becomes compressed around the cable when the two screws are tightened. This connector is one of a series that is made in sizes to accommodate single runs of various types and sizes of 2 and 3-conductor service entrance cable. Made in types to fit ¾-in. and 1-in. knockouts or threaded openings.

The G-60 Bondrite ground clamp is designed for ⅜-in. and ½-in. ground rods, and takes Nos. 8, 6 or 4 bare or insulated ground wire. The ground wire is wedged against the ground rod by tightening a set screw and lock-nut. Another clamp No. G-6, is made for ⅜-in. and ½-in. ground rods. The M. B. Austin Co., Chicago, Ill.

Vise and Folding Stand

A vise taking pipe from ⅛-in. to 2½-in., mounted on a portable folding stand that has an attached bender for pipe up to ¾-in. The stand has an oil can recess



and slots for wrenches, cutters and die-stock. Legs are of the folding type and can be secured by an attached chain when the stand is folded. The vise is available with regular three-jaw equipment, or with broad jaws to grip pipe with less marring. Armstrong Mfg. Co., Bridgeport, Conn.

Interchangeable Control Units

A line of individual units which may be assembled in combinations as may be desired to provide a wide range of industrial control stations. Moulded black

bakelite control units may be had which are interchangeable in housings for gang-mounting. The mechanisms are rated for 600 volts, and include a choice of normally open, closed, transfer, and miscellaneous contact functions. A neon pilot light unit is also available. Housings of steel and cast iron, with covers of various standardized device markings are also made for this line. The Arrow-Hart & Hegeman Electric Co., Hartford, Conn.

Thin-Wall Non-Metallic Conduit

A companion to Transite, named Korduct thin-wall conduit, is an asbestos-cement product. It is formed under high pressure on a polished steel mandrel and is said to have a smooth inner surface, a high wall strength, and resistance to abusive conditions. Korduct is recommended for underground duct systems without the use of a concrete protective envelope, or for use as conduit in exposed locations. It is said to be rot-proof, in-

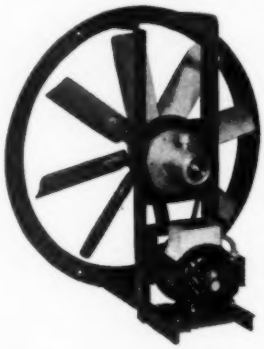
combustible, immune to electrolysis, and highly resistant to all forms of corrosion. The difference in the wall thickness of Korduct (left) and Transite is illustrated. Both are shown with standard Harrington tapered sleeve couplings. Johns-Manville Corp., New York, N. Y.

Light-Duty Hoist

For handling from 250 to 500 lbs., such as in shops, foundries, etc., "Zip-Lift" provides hoisting speeds up to 32 f.p.m. Control may be either a pendant push button or rope. Its ball bearing hoisting motor is said to provide smooth operation through a fully enclosed planetary gear train which runs in oil. Weight-type limit switch, solenoid dry disc motor brake, and ratchet-and-roller type mechanical brake are other features of design. Standard units are furnished with or without trolley. Harnischfeger Corp., Milwaukee, Wis.

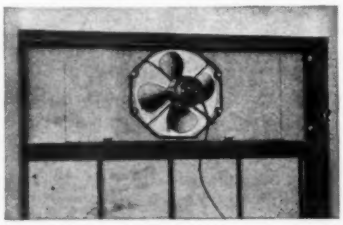
Belt-Drive Ventilating Fan

The Marvel line of ventilating fans is made in V-belt, ball bearing, and direct drive types. Belted types range from



18-in. to 48-in. sizes, these sizes having eight blades. Belt tension adjustment is said to be simple, while the motors are of standard speed and shift length. A line of aluminum-blade explosion-proof fans as used in spray booths is also available. Electric Blower Co., Boston, Mass.

Window Ventilating Fans



Adjustable window-ventilating fans in the 8-in. and 10-in. types, finished in cream enamel with nickel trim. Both fans employ a sheet steel frame with sliding end panels that can be adjusted to any ordinary window. Motors are rubber-mounted, have self-aligning ball-seat bearings, and an oil reservoir that is said to assure proper lubrication. General Electric Co., Bridgeport, Conn.

Lumiline Strip Fittings

A line of single, and "back-to-back" or multiple plug-in fittings for lumiline lamps. Standard rigid prongs are made

a part of these fittings to permit the use of "Plug-In" strip for single or continuous exposed lumiline effects. National Electric Products Corp., Pittsburgh, Pa.

Aluminum Floodlights

Three Alzak aluminum floodlights, covering a range of from 300 to 1500 watts and for use as open or enclosed

units. Featured claims are: Resistance to rust; no paint to chip or peel; and permanent high reflecting efficiency. General Electric Co., Schenectady, N. Y.

Autotransformer

A line of autotransformers ranging from 250 va up to 10 kva, wound for 220-230-240-v primary and 110-115-125-v

secondary, for stepping down from power service to lighting or small tool and heater service. They are also recommended for use to balance a 115/230 v 3-wire circuit. Sola Electric Co., Chicago, Ill.

Trade Notes . .

Snodgrass Goes to Imperial

The Imperial Electric Co., of Akron, O., announces the appointment of George M. Snodgrass as general sales manager. Mr. Snodgrass was general sales manager of the electric division of Fairbanks, Morse & Co. with which company he had been associated for the past fifteen years. Prior to that he was with Allen-Bradley Co.

New Triangle Vice Presidents

Triangle Conduit & Cable Co., Brooklyn, N. Y., announces the appointment of Julian A. Hawks as vice-president in charge of sales east of Denver, C. C. Hillis as vice-president in charge of sales in the San Francisco area and Frederick Palmer as vice-president in charge of production. Mr. Hawks was formerly secretary of the Eastern Electrical Wholesalers and secretary of the National Electrical Wholesalers Council. Mr. Hillis has been in charge of the company's San Francisco office and Mr. Palmer has been production manager for the company since its inception.

The Graybar Electric Co. announces that J. A. Mayer, formerly manager of the Denver branch, has been appointed manager at Cleveland. S. B. Hardin who succeeds Mr. Mayer at Denver was a line material specialist at Kansas City. R. W. Kimberlin, formerly merchandising manager at San Francisco, has been appointed manager at Salt Lake City.

The Paragon Electric Co., Chicago, Ill., announces the completion of an extensive factory expansion program at their plant in Manitowoc, Wis., which has practically doubled its floor space.

Tom Bibber is now special representative with the Triangle Conduit & Cable Co., Brooklyn, N. Y., engaged in sales promotion work.

Trade . . . . . .

Literature . . .

Connectors: Folder descriptive of clamp-type connectors. Burndy Engineering Co., Inc., New York, N. Y.

Carbon Resistors: A two color folder, "Yardsticks," covering carbon resistors for radio sets and assortment kits for service men. Specifications and test data are included. Ohio Carbon Co., Lakewood, Ohio.

Copper Bus: A booklet giving performance data on various bus arrangements. Anaconda Wire & Cable Co., New York, N. Y.

Take-Up Reels: Bulletin No. 503 lists Reelites for constant duty and portable types for electric cable and electric cord. Appleton Electric Co., Chicago, Ill.

Lighting Fixtures: A new catalog AL-2 listing and describing new and modernly designed Alabax porcelain lighting fixtures. Pass & Seymour, Inc., Syracuse, N. Y.

Cables and Conduits: Catalog T, 48 pages, listing the entire line of wires, cables and conduits. Triangle Conduit & Cable Co., Brooklyn, N. Y.

Bearing Reamer: A one-page pamphlet illustrates spiral self-aligning reamers for servicing the bearings of fractional horsepower motors. Watervliet Tool Co., Albany, N. Y.

Underground Duct: A brochure containing engineering and technical data on Transite (heavy-wall) and Korduct (thin-wall) conduit for use in multiple-duct transmission systems, in tunnels, bridges, etc. News Bureau, Johns-Manville Corp., New York, N. Y.

Ceiling Fans: A 16-page catalogue X-1120 on ceiling fans including information on unit glassware and ceiling type lighting fixtures. Wiring diagrams for wall switch control. The Emerson Electric Mfg. Co., St. Louis, Mo.

Portable Cable: Bulletin No. GEA-1918A gives data and listings of tellurium all-rubber, Glyptal compound, and braided types of portable cable for mining, welding and transit equipment, electric shovels and dredges, and similar apparatus. General Electric Co., Schenectady, N. Y.

Lighting Equipment: Day-Brite catalog No. 10 comprises 98 loose-leaf pages. Sections are provided to cover: Commercial showcase and wall case reflector units; adjustable picture and bracket reflectors; concealed and suspended trough units; directional and exit signs; prismatic lens assemblies; bank, church, institutional and stage lighting; industrial reflectors; and a wide selection of flush and surface type reflectors and troughs for lumiline lighting. Day-Brite Reflectors Co., St. Louis, Mo.

Classified Advertising

For Sale. Old established electrical contracting business and motor winding works for sale. Account ill health. Doing fine business in industrial center of Wisconsin. Box 82. Electrical Contracting, 330 West 42nd St., New York, N. Y.

SALESMAN WANTED: Exclusive territory, commission. Product; wire, R.C., lead and telephone. Territory: Illinois, Pennsylvania, Wisconsin, Indiana, Missouri, California, New York; (for telephone only) Minnesota, Kansas, Iowa, Texas. Box 81, Electrical Contracting, 330 West 42nd St., New York, N. Y.

. . . . HERE'S A TOOL EVERY CONTRACTOR NEEDS

The PUL-LIFT

THE Pigmy Hoist with a giant's power—It can be used for lifting motors, heavy batteries, transformers, pulling cables and on all those pulling and lifting jobs so common on contracting work.

Made in 4 sizes—½, 1½, 3 and 6 Tons capacities.

TRADE YALE MARK
Write for folder

The YALE & TOWNE MFG. CO.
Philadelphia Division Philadelphia, Pa., U. S. A.

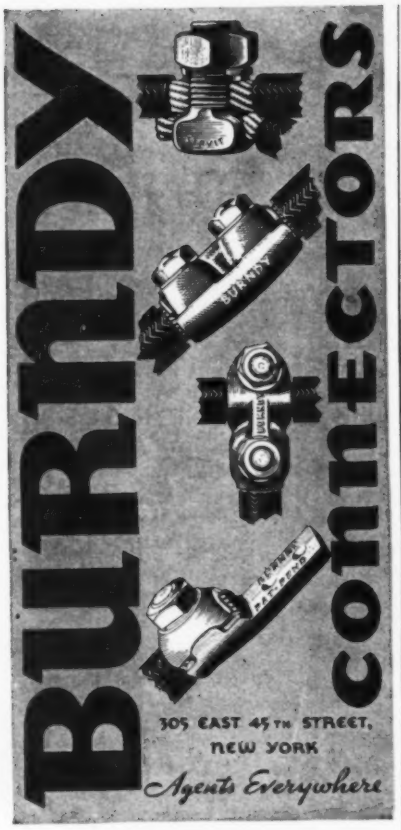
A CLEAN JOB IN LESS TIME *with The* MARR
A Perfect Joint Connector
(CAP MADE OF BAKELITE)

Think of the time saved over an extended period! Two simple operations and the job's done:

1. Twist wires in connector and set down screw;
2. Slip over Bakelite insulation and screw up tight.

You can get Marr Connectors in four sizes for standard wire gauges. Also obtainable in porcelain. Underwriters' approval. Write for free samples.

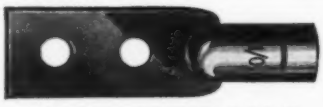
THE RATTAN MANUFACTURING CO.
552 State Street, New Haven, Conn., U. S. A.
General Sales Agents
HATHEWAY AND COMPANY
220 Church Street, New York, N. Y., U. S. A.



CASH
FOR
SURPLUS
MATERIALS

We buy for cash surplus, bankrupt and overstock electrical materials. What have you? Write.

J. B. ROBINSON
219 Huron Rd., Cleveland O.



WOLVERINE
SOLDERING LUGS
Superior Quality

Superior in design and workmanship. Wolverine Soldering Lugs are made from highest grade seamless tubing drawn from pure electrolytic copper. They are superior because made so.

Sleeves always fit rated wire or cable. Square end design provides greater contact area, increasing current capacity. Solder never leaks out closed end. Have Underwriter's approval.

WOLVERINE TUBE CO.
1441 Central Ave., Detroit, Mich.
Stocks in All Large Cities

Advertisers' Index

A
Appleton Electric Co. 44
Arrow-Hart & Hegeman Electric Co. 55

B
Benjamin Electric Mfg. Co. 37
Benolite Corp. 64
BullDog Electric Products Co. 25
Burndy Engineering Co., Inc. 64

C
Chase-Shawmut Co., The 26
Co-Op Electric Supply Co. 64
Crescent Insulated Wire & Cable Co. 52
Cutler-Hammer, Inc. 21

E
Emerson Electric Mfg. Co., The 24

F
Fullman Mfg. Co. 50

G
General Cable Corp. .....Back Cover
General Electric Co.
Front Cover, Inside Front Cover, 29, 39
Graybar Electric Co. 4, 57
Greenlee Tool Co. 34

I
Ideal Commutator Dresser Co. 60
Illinois Electric Porcelain Co. 60
Ilsco Copper Tube & Products Co.. 58

J
Jefferson Electric Co. 43

K
Krueger & Hudepohl. 58

M
McGraw-Hill Book Co. 50
Minerallac Electric Co. 58

O
Ohio Carbon Co. 34

P
Pass & Seymour, Inc. 49
Pauling, Inc., John I. 27
Plymouth Rubber Co. 30

R
Rattan Mfg. Co. 63
Reliance Automatic Lighting Co. 60
Robinson, J. B. 64

S
Sangamo Electric Co. 31
Sherman Mfg. Co., H. B. 58
Signal Electric Mfg. Co. 60
Smoot-Holman Co. 38
Square D Company..Inside Back Cover
Standard Electrical Porcelain Mfrs.. 52
Standard Transformer Co. 64
Steel & Tubes, Inc. 45

T
Tork Clock Company, Inc., The 64

U
United States Rubber Products, Inc. 2, 35

V
Van Cleef Bros. 59

W
Westinghouse Electric & Mfg. Co. 32,33
Wiremold Co., The. 22, 23
Wolverine Tube Co. 64

Y
Yale & Towne Mfg. Co. 63
Youngstown Sheet and Tube Co., The 51

BENOLITE
ELECTRIC INSULATION

Reliable electrical machinery demands dependable insulating materials. BENOLITE insulating varnishes and compounds keep electrical equipment on the job—protects it against moisture, acids, oil, etc.

For thirty years we have met and solved insulating problems of electrical machinery manufacturers. Our insulating engineers are anxious to serve you.

BENOLITE CORPORATION
Offices: Gulf Bldg., Pittsburgh, Pa.
Factory: Manor, Pa.

"Standardize on
STANDARD
Transformers"

ALL TYPES
Indoor and Outdoor Service

Send for Descriptive Bulletin

STANDARD TRANSFORMER CO.
Warren - - - - - - - Ohio

CO-OP MONTHLY *Contractors* GUIDE TO PROFITS

WHOLESALE HEADQUARTERS for WIRING DEVICES, CONSTRUCTION MATERIAL
Lighting Fixtures and Appliances—
Lowest Prices—Fast Service—
Satisfaction Guaranteed
Send for Free Catalogs

CO-OP ELECTRIC SUPPLY CO.
812 W. JACKSON BLVD., Chicago, Ill.

CLOCK
controlled
SWITCHES

Ask Headquarters
The TORK CLOCK COMPANY, Inc.
Mount Vernon, New York

SQUARE D
announces the
MULTI-BREAKER
LOAD CENTER

● **Now—for the first time—you can offer circuit breaker protection for the home at a low cost—a price comparable to that of a good range switch and fuses!**

The Multi-breakeR is small and attractive—can be installed in any wall of a home. It provides switching in each branch circuit.

To your customers, the Multi-breakeR means complete protection and a reduction in service interruptions; the elimination of the trouble and repeated expense of obtaining, storing and changing fuses.

To you, the Multi-breakeR offers the opportunity of introducing a much needed electrical convenience—one that will bring you immediate sales at a good profit.

Be the first in your community to install the new Multi-breakeR Load Center. It's ideal for electric range installations. Talk to your power company as well as your customers. But, above all, see the Multi-breakeR at your Square D distributor's showroom.

Bulletin CA-541 fully describes the Multi-breakeR.

CALL IN A SQUARE D **SQUARE D MAN**

SQUARE D COMPANY

DETROIT - MILWAUKEE - LOS ANGELES

SQUARE D COMPANY CANADA LTD. TORONTO, ONTARIO

UMI

GENERAL CABLE GUARDIAN

the Easy to Install

BUILDING WIRE

The fact that its hard wax lubricated surface makes it EASY TO PULL is only ONE advantage. GUARDIAN has an extra measure of quality for everyone:

- **Flame Retarding and Moisture Resisting Finish**
- **Soft Copper Conductors, easy to work and splice**
- **Free Stripping (Code grade) Rubber Insulation**
- **Bright Fadeless Colors for circuit identification**

You can always tell GUARDIAN by the tag. Ask for it by name. Your Electrical Wholesaler carries it in stock. Its practical advantages make it worth while for you to be particular about getting the genuine General Cable Guardian product.

GUARDIAN Brand Performite (superaging) Building Wires and Cables comply with all the requirements of Federal specifications JC106.

It's the
FREE STRIPPING
Code Wire

GENERAL CABLE CORPORATION

Sales Offices: ATLANTA · BOSTON · BUFFALO · CHICAGO · CLEVELAND · DALLAS · DETROIT · LOS ANGELES
NEW YORK · PHILADELPHIA · PITTSBURGH · ROME · SAN FRANCISCO · ST LOUIS · SEATTLE · WASHINGTON, D.C.